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Flavors of legacy: The evolution and prominence of India's spice industry

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Abstract

India, widely regarded as the “land of spices,” has played a pivotal role in the global spice trade for millennia. Archaeological evidence traces spice use in India back to 7000 BCE, with historical accounts from the Roman era and European exploration emphasizing their enduring value. In 2023-24, India cultivated spices over 4.76 million hectares, producing 11.80 million tonnes, a 5.92% increase over the previous year. The country grows 75 out of 109 International Organization for Standardization (ISO)-recognized spices, including major crops such as cumin, chilli, garlic, ginger, turmeric and coriander. Garlic leads production with 3.21 million tonnes. The leading spice-producing states include Madhya Pradesh, Gujarat, Andhra Pradesh, Rajasthan and Telangana. India's spice exports reached ₹369.59 billion in 2023-24, marking a 16% increase, driven chiefly by chillies, cumin, spice oils, oleoresins and turmeric. The top export markets are China, the USA, Bangladesh and the UAE. Meanwhile, spice imports rose to ₹120.16 billion, mainly for commodities like clove, pepper and asafetida. Approximately 75% of produced spices are consumed domestically, with the market size expected to grow from ₹407.50 billion in 2020 to ₹761.50 billion by 2026, propelled by urbanization and rising demand for packaged and e-commerce purchases. Challenges such as yield fluctuations, quality control and global competition persist. The government, through the Spices Board of India, addresses these through initiatives for enhancing productivity, quality assurance, value addition and sustainability. Crop-specific Spice Parks, SPICED schemes and branding efforts including Geographical Indication (GI) tagging help strengthen India's global market position. The adoption of sustainable and innovative farming methods, together with research and development investments, is vital for maintaining India's competitive edge and ensuring continued growth of the sector.

Keywords: Indian spices, production, export-import trade, value-addition, sustainability

Introduction

India, known as the “land of spices,” has long been at the heart of the global spice trade. Its aromatic and flavorful spices have not only shaped culinary traditions worldwide but also played a significant role in historical events such as exploration, colonization and cultural exchange (Narsimhan, 2009) [7]. For centuries, India's spice industry has been a cornerstone of its economy and today it remains a dominant force in global spice production and trade. The Indian spice industry has evolved considerably in recent years, driven by market demands, technological advancements and shifting consumer preferences. According to the Spices Board of India (2024) [13], India produces over 60 varieties of spices, accounting for 48 per cent of global spice trade by volume and 44 per cent by value. This dominant position highlights the industry's importance to both India's economy and the global spice market. As the largest producer, consumer and exporter of spices, India continues to lead in both traditional spice products and value-added offerings.

In the fiscal year 2023-24, India achieved a record spice export value of ₹ 370 billion, marking a 16 per cent increase compared to the previous year (Spice Board of India, 2024) [13]. Major contributors to this growth include red chilli, cumin, turmeric, ginger and coriander, with red chilli alone accounting for ₹ 125 billion in exports. India's ability to more than 60 out of the 109 spices recognized by the International Organization for Standardization (ISO) further underscores its dominance in the global spice market (Srinivasan *et al.*, 2024) [15].

Export destinations for Indian spices include major markets like China, Bangladesh, the U.S., and the U.A.E (Spice Board of India, 2024) ^[13]. However, despite a generally positive trend in exports, the industry faces several challenges. Crop shortages, quality concerns and issues such as ethylene oxide contamination have occasionally impacted the reputation of Indian spices abroad (Srinivasan *et al.*, 2024) ^[15]. To address these challenges and adapt to changing market demands, the industry has increasingly focused on value-added spice products like spice oils and oleoresins, which are in higher demand globally due to their application in food processing, cosmetics and pharmaceuticals.

The Indian spice industry also benefits from various government initiatives aimed at enhancing production, ensuring quality control and promoting sustainable practices. Technological innovations in farming, processing and packaging have helped the industry meet international standards and maintain its competitive edge. Sustainability is another focus area, with efforts being made to ensure environmentally friendly cultivation practices and reduce chemical usage. The Indian spice industry continues to thrive as a global leader, supported by its rich history, strong production capabilities and expanding export markets. However, challenges such as quality control and environmental concerns must be addressed for the industry to maintain its growth trajectory. Looking ahead, innovations in value-added products and sustainability efforts will be key to securing the industry's future.

History of Indian spice industry

The history of the Indian spice trade dates back thousands of years, deeply intertwined with the development of Indian civilization. Archaeological evidence suggests the use of spices in India as early as 7000 BCE (Ravindran, 2017) ^[10]. Ancient Hindu texts like the Vedas, written around 2000 BCE, highlight the significance of spices in Indian culture, particularly for their culinary and medicinal uses (Krishnamoorthy and Parthasarathy, 2011) ^[6]. India's spices gained international prominence during the Roman Empire, with Roman historian Pliny lamenting the empire's outflow of gold in exchange for Indian spices (Dalby, 2000) ^[1]. This trade continued to flourish over centuries and became a focal point for global exploration. Vasco da Gama's

discovery of a sea route to India in 1498 significantly altered the dynamics of the spice trade, leading to the establishment of European trading posts and eventually the colonization of India (Prakash, 2014) ^[9].

The British East India Company played a pivotal role during the colonial era, monopolizing the spice trade and restructuring traditional production and trade networks. After India gained independence in 1947, the government focused on revitalizing the industry. In 1960, the Spices Export Promotion Council was established, later renamed the Spices Board in 1987, to organize and promote the industry (Spice Board of India, 2024) ^[13]. In recent decades, modernization has transformed the Indian spice industry. Advances in scientific cultivation, improved processing techniques and stricter quality control measures have allowed India to maintain its leadership in global spice production and export (Parthasarathy *et al.*, 2008) ^[8]. This long-standing history of spices continues to shape India's influence on the global market.

Current status of spice industry in India

Area and production status of spice industry in India during 2023-24: India is the world's largest producer, consumer and exporter of spices. The production of different spices has been growing rapidly over last few years (Spice Board of India, 2024) ^[13]. During 2023-24 Spices cultivation occupy an area of 4.76 million ha (Table 1). There is an increase in the production of spices (5.92%) in 2023-24, which stood at 11.80 million tonnes compared to 11.14 million tonnes during 2022-23. Largest area under spice crops cultivation by Rajasthan with 9.22 lakh ha (19.38%) which is followed by Gujarat with 8.63 lakh ha (18.13%), Madhya Pradesh with 7.40 lakh ha (15.53%), Karnataka (9.41%), Uttar Pradesh (8.70%), Andra Pradesh (5.63%), Telangana (3.52%), Orissa (3.26%) and Kerala (3.20%) (Figure 1). Whereas highest production is contributed by states of Madhya Pradesh with 36.30 lakh tonnes (30.76%) followed by Gujarat with 12.90 lakh tonnes (10.93%), Andra Pradesh with 12.80 lakh tonnes (10.85%), Rajasthan (8.54%), Telangana (6.72%), Karnataka (6.26%), Maharashtra (4.48%), Assam (3.73%), Orissa (2.51%), Uttar Pradesh (2.48%), West Bengal (2.14%), Tamil Nadu (2.11%) and Kerala (1.39%) (Figure 2).

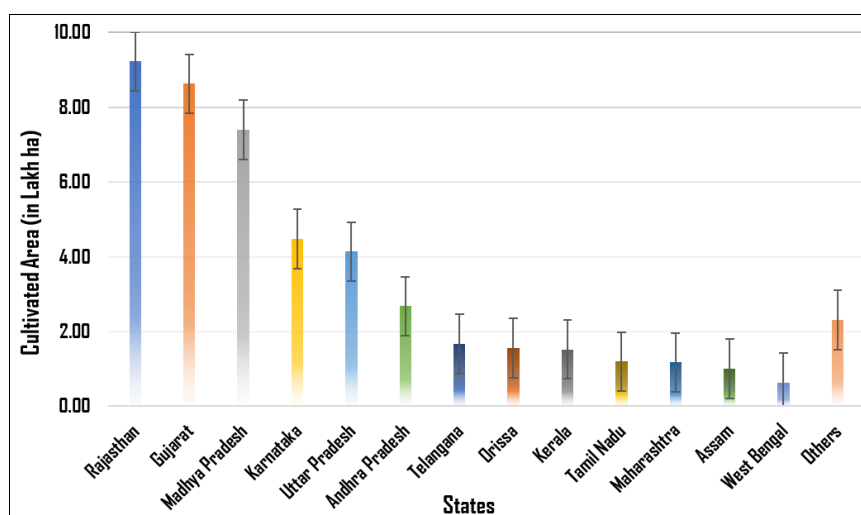


Fig 1: Area under spice cultivation in different states during 2023-24

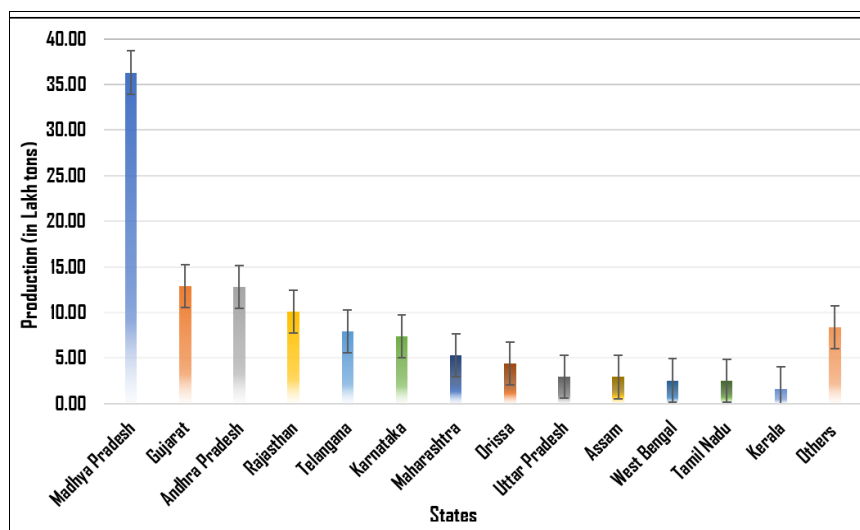


Fig 2: Production of spice commodities in different states during 2023-24

Table 1: Spice wise area and production in India during 2023-24

Sl. No.	Spice	Area (ha.)	Production (tonnes)	Area share (%)	Production share (%)	Productivity (t ha ⁻¹)
1.	Pepper	313632	125927	6.59	1.07	0.40
2.	Cardamom (S)	70410	25230	1.48	0.21	0.36
3.	Cardamom(L)	45596	9288	0.96	0.08	0.20
4.	Chilli	871504	2596634	18.30	22.00	2.98
5.	Ginger(fresh)	193192	2226239	4.06	18.86	11.52
6.	Turmeric(dry)	305182	1074526	6.41	9.10	3.52
7.	Coriander	583294	791273	12.25	6.70	1.36
8.	Cumin	1187609	860087	24.94	7.29	0.72
9.	Celery	4562	6537	0.10	0.06	1.43
10.	Fennel	155476	292292	3.27	2.48	1.88
11.	Fenugreek	145366	228649	3.05	1.94	1.57
12.	Garlic	382610	3213930	8.04	27.23	8.40
13.	Tamarind	39639	148958	0.83	1.26	3.76
14.	Clove	2063	1578	0.04	0.01	0.76
15.	Nutmeg	24176	18254	0.51	0.15	0.76
Grand total		4761260	11801737			2.48

The area and production status of Indian spice commodities are presented Table 1. Cumin occupies the leading position under spice cultivation with an area of 11.88 lakh hectares (24.94%), followed by dry chillis with 8.71 lakh ha (18.30%), coriander with 5.83 lakh ha (12.25%), garlic (8.03%), pepper (6.59%), turmeric (6.41%), ginger (4.06%), fennel (3.26%) and fenugreek (3.05%). Whereas, the maximum production has been shared by garlic with 32.14 lakh ha (27.23%) followed by dried chillis with 25.97 lakh ha (22.00%), ginger with 22.26 lakh ha (18.86%), turmeric (9.10%), cumin (7.29%) and coriander (6.70%) (Spice Board of India, 2024) ^[13].

Among the spice crops production garlic holds the leading position with 32.14 lakh tonnes with a productivity of 8.40 t ha⁻¹, which is cultivated as a cool season crop in 20 states across India and majority of area confined to Madhya Pradesh, Rajasthan, Uttar Pradesh and Gujarat. Chillis (dry) occupied second position with 25.97 lakh tonnes with the productivity of 2.98 t ha⁻¹, which is cultivated in tropical and sub-tropical regions of 23 states of India and majority of area lies in Telangana, Madhya Pradesh and Karnataka states. Ginger (fresh) occupied third place in production with 22.26 lakh tonnes with the productivity of 11.52 t ha⁻¹, which is reported to be maximum among the spices, it is cultivated in tropical and sub-tropical zones of India and majority of area confined to Madhya Pradesh, Karnataka, Odisha, Sikkim, Maharashtra and West

Bengal states. The annual production of turmeric (dry) is 9.10 lakh tonnes with the productivity of 3.52 t ha⁻¹, which is cultivated in tropical and subtropical zones across India and majority of area lies in Maharashtra, Telangana, Odisha, Tamil Nadu and Karnataka states. Annual seed spices production is 21.79 lakh tonnes with maximum contribution from cumin and coriander having average productivity of 1.05 t ha⁻¹, which are cultivated in Madhya Pradesh, Rajasthan and Gujarat states. Black pepper is produced about 1.26 lakh tonnes with the productivity of 4.01 q ha⁻¹, which is cultivated in humid tropical region of south India mainly Kerala and Karnataka states. Small cardamom along with large cardamom is produced about 34.52 thousand tonnes, with the productivity of 3.58 and 2.03 q ha⁻¹ respectively, which are cultivated in humid tropical zones of south India and Eastern Himalayan hilly regions of north India and majority of area lies in Karnataka, Kerala, Sikkim, West Bengal and Arunachal Pradesh states. Annual production of 1.49 lakh tonnes with the productivity of 3.76 t ha⁻¹ which is majorly cultivated in Tamil Nadu, Kerala, Karnataka, Andhra Pradesh and Maharashtra states. Tree spices such as clove and nutmeg & mace are produced about 1.58 and 18.25 thousand tonnes respectively, whose cultivation is majorly confined to Karnataka, Kerala and Tamil Nadu states. Vanilla cultivation is limited to Karnataka and Kerala states, whereas, saffron cultivation is restricted to Jammu and Kashmir region only.

Export and import trends of spice commodities

Export scenario of spice commodities

India is the largest exporter of spice and spice items, which comprises the most valuable commodity in terms of foreign exchange earnings among the horticulture produce (Figure 3). In the past ten years, the value of spice commodities exported had increased nearly three-fold, rising from ₹ 137.35 billion in 2013-14 to ₹ 369.59 billion in 2023-24 (Figure 5). From 2016-17 to 2022-23, the total exported quantity from India grew at a CAGR of 5.85 per cent. For 2023-24, total volumes of chilli, cumin, spice oils and oleoresins, turmeric and coriander exports were 6.01, 1.65, 0.19, 1.62 and 1.09 lakh tonnes, also expanded in value as compared to 2022-23. Among various spice

commodities, chillis played a significant role in export, bringing in ₹ 124.92 billion with a 33.80 per cent share, followed by cumin, which brought in ₹ 57.97 billion with a 15.69 per cent share, spice oil and oleoresins, brought in ₹ 41.23 billion with 11.16 per cent share, mint products including menthol, menthol crystals and other mint oils, which brought in ₹ 34.39 billion with 9.31 per cent share, turmeric brought in ₹ 18.76 billion with a 5.08 per cent share, curry powder and pastes brought in ₹ 17.57 billion with a 4.76 per cent share and other commodities like pepper products, ginger, cardamom, garlic, nutmeg and mace as well as other seed spices in considerable quantity with significant export earnings for the Indian spice sector (Spice Board of India, 2024) ^[13].

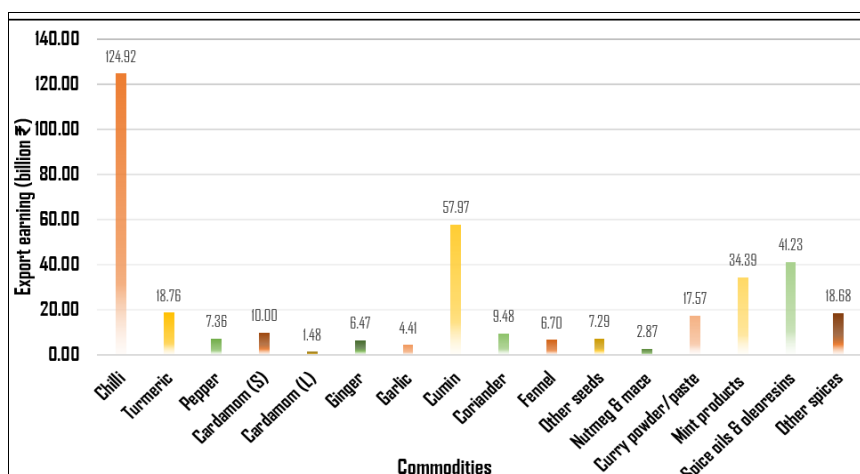


Fig 3: Export value of different spice commodities during 2023-24

India exported spices and spice products to more than 185 countries globally, offering a diverse range of over 225 different spice products (Spice Board, 2022) ^[14]. The top destinations among them were China, the USA, Bangladesh, the UAE, Thailand, Malaysia, Indonesia, the UK, and Sri Lanka. These nine destinations comprised more than 70 per cent of the total export earnings in 2023-24 (until February 2024). China imported spice valued at ₹ 60.18 billion from India, while the USA imported spices worth ₹ 42.78 billion. Bangladesh imported spices amounting to ₹ 24.59 billion. Additionally, the UAE imported spices worth ₹ 17.81 billion from India during 2023-24 (up to February 2024). Chilli was the most exported spice from India. During 2023-24, China and USA imported chilli. The main products imported by the USA are celery, cumin, curry powder, fennel, fenugreek, garlic, chilli and mint products.

Import scenario of spice commodities

Imports of spice commodities have been rising over the past few years. Figure 4 show the total value and trend of various horticultural commodities imported during the fiscal years 2013-14 and 2023-24. The total value of imported spice commodities increased by four-fold over the previous ten years, from ₹ 29.06 billion to ₹ 120.16 billion during 2013-14 to 2023-24 fiscal years. For 2023-24, total volumes of pepper, clove, asafetida, spice oils and oleoresins, mint products and cassia imports were 0.34, 0.24, 0.02, 0.05, 0.12 and 0.38 lakh tonnes, also expanded in value as compared to 2022-23. Pepper account for the maximum imports worth of ₹ 13.60 billion with a 11.32 per cent share, followed by clove worth of ₹ 13.52 billion with a 11.25

per cent share, asafetida imports accounting for ₹ 12.41 billion with a 10.32 per cent share, spice oil and oleoresins import accounting for ₹ 11.82 billion with a 9.84 per cent share, mint products including menthol, menthol crystals and other mint oils import worth of ₹ 11.56 billion with a 9.62 per cent share, cumin imports worth of ₹ 7.92 billion with a 6.60 per cent share, cassia worth of ₹ 7.89 billion with a 6.57 per cent share as well as other commodities like cinnamon, star anise, nutmeg, mace, tamarind, saffron, garlic, cardamom, ginger and other seed spices at considerable quality (Spice Board of India, 2024) ^[13].

Export and import trend of spice commodities during 2013-14 to 2023-24

The Figure 5 provides a decade-long view of the export and import values of spices in India from the financial year 2013-14 to 2023-24, measured in billion INR. The export of spices has shown consistent growth over the years. From ₹ 137.35 billion in 2013-14, it has risen significantly to ₹ 369.59 billion in 2023-24. This reflects the increasing demand for Indian spices globally, as well as the country's growing capacity to produce and export. Imports, though much lower than exports, have also grown steadily, from ₹ 29.06 billion in 2013-14 to ₹ 120.16 billion in 2023-24. The rise in imports may be attributed to increased domestic demand for spices not abundantly available in India or specific spice varieties needed for processing and re-export. Throughout the decade, India maintained a trade surplus in spices, exporting far more than it imports. The gap between exports and imports has widened, especially from 2020-21 onwards, where exports surpassed ₹ 300 billion, while imports crossed ₹ 70 billion.

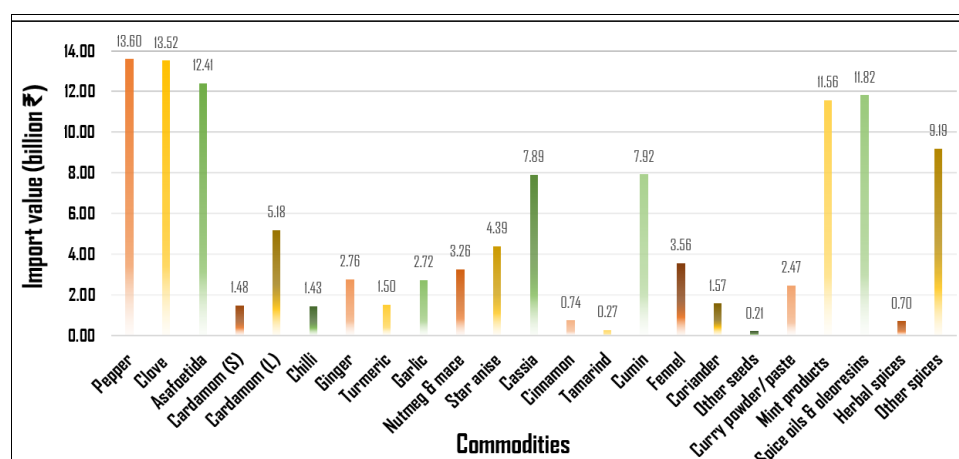


Fig 4: Import value of different spice commodities during 2023-24

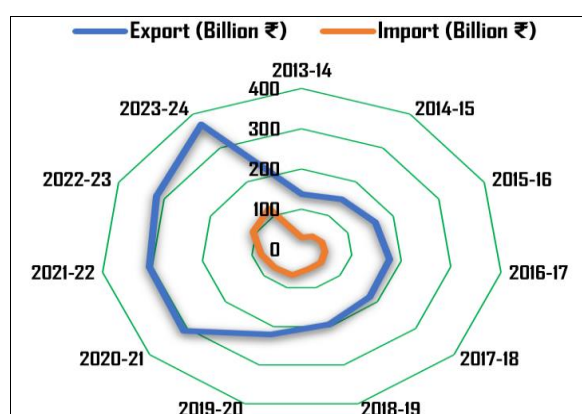


Fig 5: Export and import trend of spice commodities from 2013-14 to 2023-24 in India

A substantial increase in both exports and imports can be observed from 2019-20 onward, with exports crossing ₹ 220 billion and imports exceeding ₹ 66 billion. The highest growth in exports occurred between 2019-20 and 2020-21, possibly due to increased global demand for spices during the pandemic, where exports jumped by almost ₹ 90 billion in a single year. In the latest years (2022-23 and 2023-24), exports continue to grow, reaching a high of ₹ 369.59 billion in 2023-24, while imports have also seen significant growth, surpassing ₹ 100 billion in 2022-23. The Indian spice industry has experienced robust export growth over the past decade, cementing India's position as a leading global spice exporter. However, rising imports indicate increasing domestic demand or specialized needs within the spice processing industry. The industry shows a healthy trade balance with sustained export momentum.

Domestic consumption and market trends of spices in India

India's domestic market remains the primary consumer of its vast spice production, with approximately 75 per cent of spices produced being consumed within the country. While exports play a key role in the global spice trade, the Indian domestic market is also a crucial driver of growth. Valued at ₹ 407.50 billion in 2020, the Indian spice market is projected to nearly double to ₹ 761.50 billion by 2026, growing at a compound annual growth rate (CAGR) of 11.10 per cent (IMARC Group, 2021). This growth is fueled by increasing consumer demand, urbanization and changing consumption patterns.

One significant shift in the domestic market is the rise of modern retail formats and e-commerce platforms, particularly following the COVID-19 pandemic. Online spice sales have surged, with

well-known brands such as MDH, Everest and Tata Consumer Products experiencing substantial growth through e-commerce channels. This shift towards online shopping reflects broader changes in consumer behavior, where convenience and accessibility play increasingly important roles in purchasing decisions. The packaged spices segment is also witnessing rapid growth, largely driven by urbanization and evolving lifestyles. This sector is expected to grow at a CAGR of 14.50 per cent from 2021 to 2026 (Research and Markets 2021), as consumers, particularly in urban areas, gravitate towards ready-to-use, pre-packaged spices for convenience and consistency.

Despite this modernization, regional variations in spice consumption remain deeply rooted in India's diverse culinary traditions. For example, mustard seeds are more commonly used in Eastern India, while curry leaves are a staple in Southern Indian cooking. Additionally, the growing interest in natural health remedies has led to an increased demand for spices like turmeric, ginger and black pepper in the Ayurvedic and nutraceutical industries. These spices are valued for their medicinal properties and are now widely used in natural health products.

Research and Development in the Spice sector

To enhance the productivity, quality and sustainability of spice cultivation in the country Government of India, through institutions like the Indian Council of Agricultural Research (ICAR) and the Spices Board of India, has been actively promoting Research and Development activities to address challenges faced by the spice industry. Spices Board of India (Ministry of Commerce and Industry, Government of India) was established in 1987 to develop, promote and regulate the export of 52 spices and spice products that fall under its purview. It is the flagship organization for the development and worldwide promotion of the production, processing, domestic marketing and export of Indian spices by creating an international link between the Indian exporters and the importers abroad. The main activities of the board involve promotion, maintenance and monitoring of quality, development of better production methods, guidance, financial and material support to growers, infrastructure facilitation and research. This board has been spearheading activities for the excellence of Indian spices, involving every segment of the industry.

The Indian Institute of Spice Research (IISR) in Kozhikode and the National Research Center on Seed Spice (NRCSS) in Ajmer are leading ICAR institutes exclusively devoted to research on major and tree spices and seed spices respectively. The major objectives include conducting basic, applied and strategic research on genetic resources, crop improvement, production

and protection technologies for enhanced production of safe spices. They also provide the necessary research infrastructure to tackle the burning problems of the spice industry and serve as a center for training demonstrations and supplying planting materials. These institutes work through region-specific programs by AICRP, voluntary centers and regional research centers to solve key problems of spices. They also tackle global issues like climate change, resource management and public health, ensuring that research benefits society and the economy. Their focus includes developing disease-resistant, high-yielding spice varieties, improving post-harvest processing and promoting sustainable farming practices to minimize environmental impact.

The Directorate of Arecanut and Spices Development (DASD), Calicut is a subordinate office under Ministry of Agriculture, Government of India plays a key role in advancing India's spice sector by overseeing the implementation of government policies and development programs aimed at improving spice production, quality and sustainability. The director coordinates with research institutions to drive innovations in crop improvement, disease resistance, and sustainable farming practices. Additionally, they support farmers through training, providing planting materials, and disseminating best practices. By promoting value addition and aligning with international standards, the director also helps enhance the global competitiveness of Indian spices, ensuring their continued growth in both domestic and export markets.

Government Initiative to Support Indian Spice Industry

India is the world's largest producer, consumer and exporter of spices. The Indian spice industry, a cornerstone of the country's agricultural and export economy, has been significantly strengthened by various government initiatives. Recognizing India's status as the largest producer and exporter of spices globally, the government has implemented a range of programs to enhance productivity, quality and global competitiveness. The Spices Board of India, under the Ministry of Commerce and Industry plays a pivotal role in promoting modern cultivation techniques, building processing infrastructure and ensuring compliance with international standards. Initiatives like establishing Spice Parks, provision of subsidies, research and development support, and promoting Geographical Indication (GI) tags spices have empowered farmers, increased export revenues and strengthened India's position in the global spice market. The Government of India, through the Spices Board, has introduced several schemes to support the cultivation and export of Indian spices, which are discussed in the following paragraphs.

Eight crop-specific Spice Parks were established in key production/market centers intending to facilitate farmers' getting an improved price realization, exporting spices and providing facilities that meet international standards and wider reach for their produce. These parks integrate all stages of spice production, from cultivation and post-harvest processing to packaging, storage and export. They offer advanced infrastructure for cleaning, grading, grinding and packaging, along with common amenities like quality labs and warehousing. Spice Parks aim to improve product quality, support rural employment and ensure better pricing for farmers by connecting them directly with exporters, fostering a sustainable, competitive supply chain (Spice Board of India, 2024) ^[13]. These include the Guntur Spice Park in Andhra Pradesh, which specializes in chillies and chilli products, and the Puttady Spice Park in Kerala, focusing on cardamom and pepper. Rajasthan consist of two spice park, Jodhpur processes cumin, coriander and fennel,

while Kota concentrates on coriander and cumin. Sivaganga Spice Park in Tamil Nadu is centered on chillies and turmeric while, Raebareli spice parks in Uttar Pradesh process mint. Madhya Pradesh hosts two parks viz., Chhindwara, focusing on garlic and seed spices while Guna specializing in coriander and garlic. The network of parks strategically designed to enhance India's spice industry by providing world-class processing and export facilities.

Geographical Indications (GI) are issued by the Geographical Indication Registry under the Department of Industrial Policy and Promotion, Ministry of Commerce and Industry for their authenticity and integrity. At present 29 spices are awarded with GI tags, as it certifies the product originates from a specific region and possesses unique characteristics tied to that area (Spice Board of India, 2024) ^[13]. This creates a unique identity for the spice, making it easier for buyers to associate the product with its quality and enhances the spice's authenticity, quality and marketability, both domestically and globally, helping to distinguish it from its imitations (Sachin *et al.*, 2023) ^[12]. The GI tag not only protects the cultural heritage of traditional farming practices but also adds value to the product, enabling farmers to command premium prices in international markets. By promoting unique, high-quality spices with GI tags, India can strengthen its position in the global spice trade and increase its export competitiveness.

The government has introduced export promotion schemes such as the Merchandise Exports from India Scheme (MEIS) and the Export Promotion Capital Goods (EPCG) scheme to incentivize spice exporters. MEIS supports spice exports by providing duty credit scrips, reducing costs for exporters and making Indian spices more competitive globally. It encourages value addition, helping exporters improve production quality, packaging, and branding while promoting expansion into new markets. By improving profit margins, MEIS enables reinvestment in business and enhances the global reach of Indian spices (Directorate General of Foreign Trade, 2024) ^[4]. The Export Promotion Capital Goods (EPCG) scheme helps boost Indian spice exports by allowing exporters to import capital goods, such as machinery and equipment, at reduced or zero customs duty. This enables spice producers to upgrade their processing, packaging and manufacturing technologies, improving the quality and efficiency of production. With better infrastructure, exporters can enhance value addition, meet international standards and increase their competitiveness in global markets, ultimately driving the growth of Indian spice exports (Directorate General of Foreign Trade, 2024) ^[4].

The Spice House Certification Scheme was implemented to ensure high standards in the processing and export of spices. The certification is awarded to processing units that meet strict food safety and quality control criteria, adhering to international standards (FAO, 2000) ^[5]. The scheme promotes hygienic processing practices, clean and safe spices, and traceability in the supply chain. By ensuring compliance with these standards, this scheme enhances the credibility and marketability of Indian spices in global markets, boosting consumer confidence and facilitating smoother export processes (Spice Board of India, 2024) ^[13].

Branding initiatives like 'Brand India' and 'Flavourit Indian Spices' position Indian spices as premium products with unique flavours and health benefits. Brand India focuses on building a strong global identity for Indian agricultural products, including spices, by showcasing their quality, heritage, and diversity. It emphasizes the richness of Indian spices and their contribution to the global food industry. Flavourit Indian Spices is a specific

branding initiative aimed at highlighting the authenticity, purity, and unique flavor profiles of Indian spices. It promotes India as a premier source of spices, ensuring consumers of high-quality, clean, and safe products. This initiative enhances the visibility of Indian spices in international markets and strengthens the country's position as a leading exporter. Together, these initiatives help in market expansion, brand building and increasing the global appeal of Indian spices (Spice Board of India, 2024)^[13]

The Department of Export Development and Promotion of Spices has initiated a subsidy scheme “Spices Processing in North Eastern Region” to grant financial assistance to the exporters/research institutions, farmers associations, spice growers cooperatives, NGOs representing spices growers and entrepreneurs in the North-Eastern and hill states to establish primary processing facilities for spices.

To boost the quality of spice for exports through post-harvest improvement, promoting value-added spice exports, increasing area and productivity of both small and large cardamom, the SPICED scheme (Sustainability in Spice Sector through Progressive, Innovative and Collaborative Interventions for Export Development) to be implemented until 2025-26. With an approved outlay of ₹ 4.22 billion, the scheme emphasizes value addition, innovation and sustainability through initiatives like Mission Value Addition, Mission Clean and Safe Spices and promoting GI-tagged spices. It prioritizes farmers' groups, FPOs, SC/ST communities and SMEs (Small and Medium Enterprises), offering support for post-harvest improvements, technological upgrades, and market expansion. The scheme also fosters entrepreneurship via Spice Incubation Centers and encourages participation in international trade events, aiming to enhance India's global competitiveness in the spice sector.

Conclusion

The Indian spice industry stands as a global benchmark for both scale and diversity, deeply rooted in centuries of tradition while adapting rapidly to modern demands and challenges. Fueled by robust domestic consumption and strong export performance, India maintains its position as the world's leading producer, consumer and exporter of spices. Government-led initiatives such as infrastructure development through Spice Parks, the promotion of Geographical Indication tags and various export incentive schemes have greatly strengthened the sector, enhancing quality control, supporting farmers and encouraging innovation across the value chain. Advanced research institutions and R&D investments have played a crucial role in the evolution of the industry, driving productivity, quality assurance, and sustainability in cultivation and processing. While the sector faces hurdles like fluctuating crop yields, quality concerns and the need for compliance with international safety standards, its ability to innovate through value-added products and sustainable practices offers a promising outlook. Moving forward, continued focus on quality enhancement, environmental responsibility and leveraging branding initiatives will be essential to sustain India's legacy and global leadership in the spice trade, ensuring long-term benefits for farmers and the national economy alike.

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