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High-Value Commercial Crops in India: Present Status and Prospects for Augmenting Productivity, Quality, Value Addition and Exports



ICAR-CENTRAL TOBACCO RESEARCH INSTITUTE
(ICAR-NATIONAL INSTITUTE FOR RESEARCH ON COMMERCIAL AGRICULTURE)
RAJAHMUNDRY - 533 105, ANDHRA PRADESH, INDIA

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High-Value Commercial Crops in India: Present Status and Prospects for Augmenting Productivity, Quality, Value Addition and Exports

भाकृअनुप – केन्द्रीय तम्बाकू अनुसंधान संस्थान
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Preface



Commercial agriculture plays an important role in Indian economy in contributing to agricultural GDP, providing livelihood and income to sizeable population, and enhancing agricultural exports. In India, the commercial crop sector is gaining momentum in the recent past since agriculture is being treated as an agribusiness industry. Recent policy initiatives and strategies are being formulated in the direction of improving agriculture as whole and consolidate India's position at the global agricultural landscape. In this backdrop, it was desired at the institute level to assess the current status of production and export of selected high value crops and immense need for processing, value addition, and enhancing agri-exports in the country.

Accordingly, the institute needs to present the production and export landscape of high value commercial crops in contrast with other major agricultural producing nations across the world and to realize the India's potential in export of several high value commercial crops. Hence, it is the need of the hour to focus on enhancing productivity, increasing processing and value addition through research and technological interventions to tap the untapped potential in these commercial crops. This technical bulletin titled "**High-Value Commercial Crops in India: Present Status and Prospects for Augmenting Productivity, Quality, Value Addition and Exports**" is published at a crucial juncture when **ICAR-Central Tobacco Research Institute** transforming into **ICAR-National Institute for Research on Commercial Agriculture** to present a clear picture about the India's position in these high value commercial crops at the global level.

The Institute is grateful to ICAR to constitute **Expert Committee** on re-christening and broadening the mandate of the institute by including chilli, turmeric, castor and ashwagandha, drafting recommendations and preparing vision, mission and the future research roadmap to exploit new horizons and opportunities to unleash the potential of this unique institute under the umbrella of the council. Finally, I compliment the authors for their genuine efforts in bringing out this publication embodying all relevant information about the high value commercial crops, future perspectives and research priorities to harness the untapped potential in commercial agriculture and India's prominence at the global agricultural landscape.

Date: 24.01.2023

(M. SHESHU MADHAV)
DIRECTOR

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Commercial Agriculture-Introductory Background

Historically, the universal importance of commercial agriculture in man's economic and socio-cultural development is well established across the world. The commercialization of agriculture is a multidimensional phenomenon of production with market orientation. Indian agriculture has been undergoing spectacular changes over the years, which are manifestations of large-scale commercialization and diversification taking place in the sector. These latest changes are responses of Indian agriculture to the new economic environment ushered by the process of Liberalization, Privatization, and Globalization (LPG). The contribution from commercial agriculture, a sub-sector of Indian agriculture could play a major role in achieving many Sustainable Development Goals (SDGs) and targets, associated with agriculture initiatives that can reduce hunger, and poverty, and enhance economic growth. After achieving self-sufficiency in food grain production during the last few decades, Indian agriculture witnessed a transformation towards the path of acquiring commercial traits on a significant scale. Of late, new trends are emerging in agriculture based on market forces and currently, agriculture is treated as an agri-business enterprise with the overall interest to enhance farm returns, profitability, value addition and exports. The resilience of Indian agriculture as a single bright sector has demonstrated positive growth (3.4%) and contributed to nearly 20% of the country's GDP while the whole economy contracted by 7.2% during the pandemic year (2020-21). Hence, there is a need for many Emerging Market Economies (EMEs) like India to harness the untapped potential in commercial agriculture.

National initiatives related to the agriculture sector have stimulated new interest among different stakeholders ranging from research scientists, policymakers, corporate players, and more importantly among farmers to instill new dynamism and to accelerate agriculture growth. The main strategies are focused on the remodeling of commercial agriculture, inculcating entrepreneurship among the farmers, turning agricultural units into enterprises by focusing on export-centric farming and emphasis on augmenting farmers' income. In recent years, Indian agriculture has been witnessing paradigm shift in outlook and focus

from food security to income security, from conventional crops to commercial crops, and from mono-cropping to crop diversification. Keeping these things in view, an attempt has been made to ascertain the current status of production and export of chilli, turmeric, castor, and tobacco in major producing countries across the world and across the major producing states in India and export status and export directions of these commercial crops and to analyze the scope for enhancing productivity, processing, value addition, and export promotion of these crops at the national level.

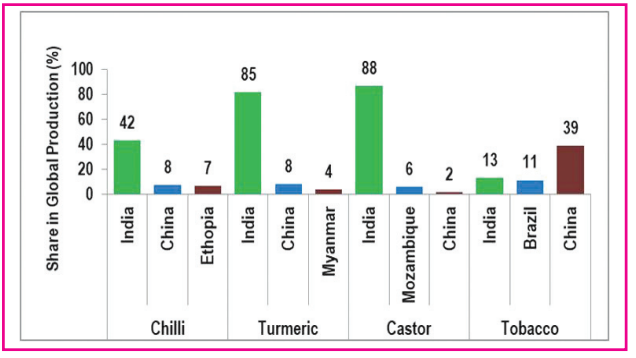
Production and Export Landscape of High-Value Commercial Crops

India is the leading producer of several high-value commercial crops in the world. The high-value commercial crops are selected for analysis based on their potential to generate high returns, greater scope for post-harvest processing and value addition, and tremendous export potential to generate foreign exchange revenue to the national economy. Currently, India enjoys a pre-eminent position in the global production and exports of high-value commercial crops such as chilli, turmeric, and castor, while in tobacco, India ranks second in both production and exports.

Table 1: Status of Indian high-value commercial crops at the global level

Crops	Production			Exports			
	Production (lakh tons)	India's share (%)	India's rank	Volume of exports (lakh tons)	India's share (%)	Value of exports (Rs.crore)	India's rank
Chilli	20.49	42	First	5.57	56	8582	First
Turmeric	13.31	85	First	1.53	76	1784	First
Castor	16.47	88	First	6.90	87	7805	First
Tobacco	7.58	13	Second	2.12	9	6306	Second
Total	**57.85**			**16.12**		**24477**	

Source: Spice Board, 2022, SEA, 2022 & FAOSTAT, 2022



Source: Spice Board, 2022, SEA, 2022 & FAOSTAT, 2022

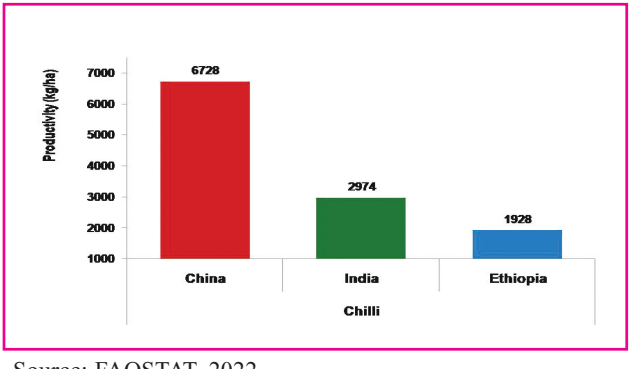
Figure 1. Share in Global Production of High-Value Commercial Crops in Major Producing Countries

Globally, among the major producing countries, India ranks first in the production of chilli, contributing major share of (42%) of world production, followed by China (8%) and Ethiopia (7%). In turmeric, India ranks first in the production, accounts for a lion share of (85%) world production, followed by China (8%) and Myanmar (4%). In castor, India accounts for a lion share of 88% of world production. In tobacco, India accounts for 13% of global production. Presently, India is the world leader in the export of chilli (56%), turmeric (76%), castor (87%), and second position in tobacco (9%) at the global level (Table 1, Figure 1).

Productivity Landscape of High-Value Commercial Crops in Major Producing Countries

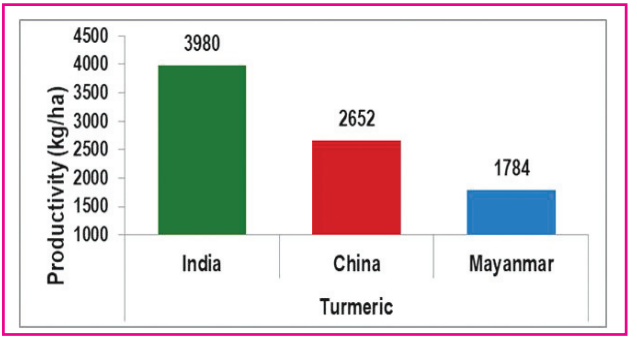
Crop productivity is a good indicator to compare the efficiency level across regions despite being influenced by factors like genetic potential, agro-climatic conditions, the extent of investment in R&D, etc. The average productivity of high-value commercial crops is analyzed to compare the productivity across the major producing countries during the year 2021. Globally, China is considered the benchmark country owing to the recorded highest productivity in chilli (6728 kg/ha), followed by India (2974 kg/ha) and Ethiopia (2974 kg/ha) (Figure 2). Though India is the largest producer of chilli in the

world, the productivity in China is almost 2.5x times greater than that of India, which is very much significant. In contrast, India recorded the highest productivity in turmeric (3980 kg/ha) followed by other minor producing countries such as China (2652 kg/ha) and Myanmar (1784 kg/ha) in 2021 (Figure 3). Thus, India continues to enjoy the status of the largest producer of turmeric in the world. In castor, China stood at the highest productivity (1688 kg/ha) followed by India (1331 kg/ha) and Myanmar (832 kg/ha) in 2021 (Figure 4). Though India enjoys the status of a virtual monopoly in castor production in the world, the productivity level is lower than that of China. Among the major tobacco producing countries, the China stood highest in productivity (2269 kg/ha) followed by USA (2247 kg/ha), Brazil (2130 kg/ha), India (1750 kg/ha) and Zimbabwe (1640 kg/ha) in the world during 2021 (Figure 5). Globally, India ranks fourth in the productivity of tobacco. The comparison of productivity gaps among producing countries is an index that indicates efficiency levels. Hence, there is a need to enhance and sustain the current productivity levels in these crops to maintain India's position in the world. Thus, there is a need for enhancing productivity with crop-specific technological interventions and innovations in these commercial crops through research and technological development in India.



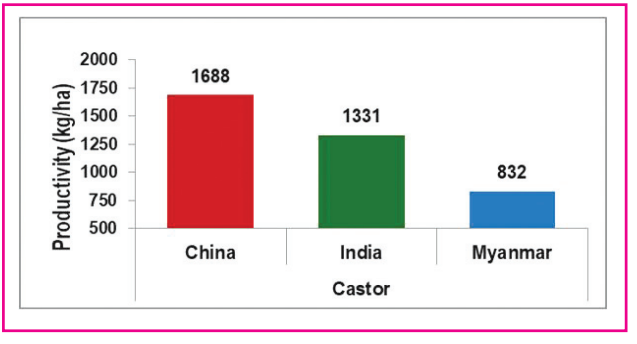
Source: FAOSTAT, 2022

Figure 2. Productivity of chilli in major producing countries during 2021



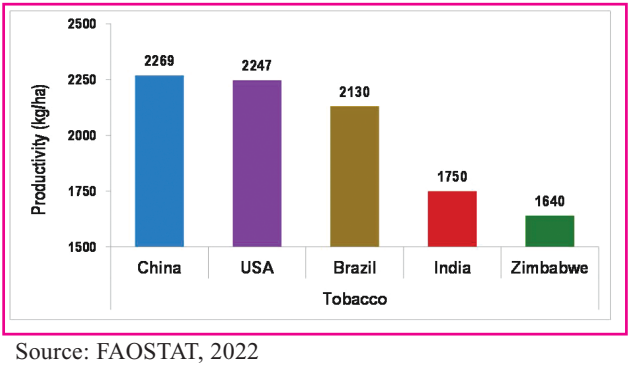
Source: DAC&FW, 2022 & APEDA, 2022

Figure 3. Productivity of turmeric in major producing countries during 2021



Source: FAOSTAT, 2022

Figure 4. Productivity of castor in major producing countries during 2021



Source: FAOSTAT, 2022

Figure 5. Productivity of tobacco in major producing countries during 2021

Geographical Distribution of Selected High-Value Commercial Crops in India

India produces several high value commercial crops in different agro-climatic zones. These commercial crops have immense potential to increase farmers' incomes, and augment agricultural exports.

a) Chilli

Chilli is one of the most important commercial crops, which is grown almost throughout the country. The crop is predominantly grown in the states of Andhra Pradesh, Telangana, Madhya Pradesh, Karnataka, West Bengal, and Orissa. These six states account for >80 % of Indian chilli production during the last five years. Its cultivation is confined to small pockets in other states such as Gujarat and Assam, etc. The average area, production, and productivity of chilli in the major producing states during the last five years (2017-18 to 2021-22) are provided in the table-2 and figure-6.

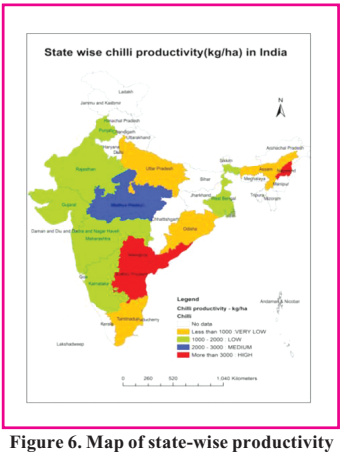


Figure 6. Map of state-wise productivity of chilli in India (Avg. of 5 years: 2017-2022)

b) Turmeric

Table 2: Major chilli producing states in India (Avg. of 5 years: 2017-2022)

States	Area (lakh ha)	Share (%)	Production (lakh tons)	Share (%)	Productivity (kg/ha)
Andhra Pradesh	1.63	23	5.33	33	3265
Telangana	0.89	12	3.53	22	3945
Madhya Pradesh	1.00	14	2.23	14	2222
Karnataka	1.12	16	1.65	10	1467
West Bengal	0.36	5	0.43	3	1180
Orissa	0.69	10	0.53	3	769
India	**7.16**	**100**	**16.20**	**100**	**2263**

Source: Spice Board, 2022

Turmeric (Indian saffron), the 'Golden Spice of India, is an important commercial spice crop grown in India. The major states producing turmeric are Telangana, Maharashtra, Karnataka, Tamil Nadu, Andhra Pradesh, Madhya Pradesh and West Bengal. These seven states account for >80 % of turmeric production during the last five years. Turmeric is also cultivated in smaller pockets in other states such as Odisha, Mizoram, etc. The average area, production, and productivity of turmeric in major producing states during the last five years are provided in the table-3 and figure-7.

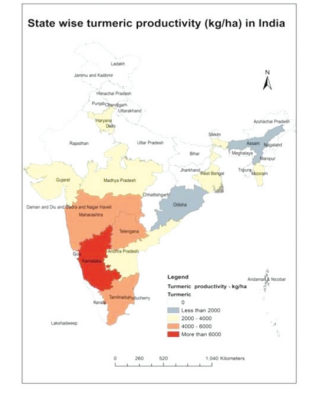


Figure 7. Map of state-wise productivity of turmeric in India (Avg. of 5 years: 2017-2022)

Table 3: Major turmeric producing states in India (Avg. of 5 years: 2017-2022)

States	Area (lakh ha)	Share (%)	Production (lakh tons)	Share (%)	Productivity (kg/ha)
Telangana	0.60	21	3.35	32	5576
Maharashtra	0.35	12	1.50	14	4295
Karnataka	0.21	8	1.31	12	6100
Tamilnadu	0.23	8	0.97	9	4136
Andhra Pradesh	0.26	9	0.75	7	2918
Madhya Pradesh	0.16	6	0.55	5	3530
West Bengal	0.20	7	0.49	5	2457
India	**2.80**	**100**	**10.60**	**100**	**3781**

Source: Spice Board, 2022

c) Castor

Castor is one of the oldest cultivated crops, predominantly grown in arid and semi-arid regions and India has been acknowledged as the world leader in production. The crop frequently experiences fluctuations in production as its cultivation depends on the farmer's choice of crop, which is mainly driven by price factor, occasionally farmers shift to other remunerative crops from castor due to aberrant weather conditions. The average area, production, and productivity of castor in major producing states during the last five years (2017-18 to 2021-22) are provided in the table-4 and figure-8. The most silent feature is India enjoys virtual monopoly in castor production in the global level.

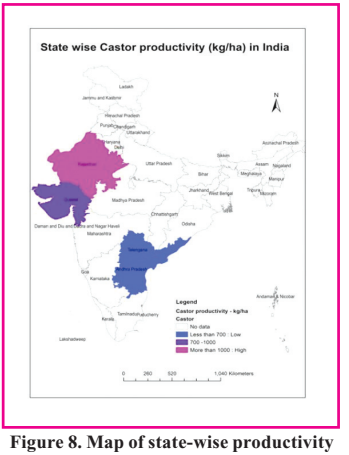


Figure 8. Map of state-wise productivity of castor in India (Avg. of 5 years: 2017-2022)

Table 4: Major castor producing states in India (Avg. of 5 years: 2017-2022)

States	Area (lakh ha)	Share (%)	Production (lakh tons)	Share (%)	Productivity (kg/ha)
Gujarat	14.7	87	12.77	84	868
Rajasthan	1.4	8	1.84	12	1359
Andhra Pradesh & Telangana	0.5	3	0.40	3	828
India	**16.9**	**100**	**15.20**	**100**	**901**

Source: SEA, 2022

d) Tobacco

Tobacco is one of the important high-value commercial crops in India. A unique feature of tobacco production in India is that myriad styles of Flue-cured Virginia (FCV) and non-FCV tobaccos *viz., bidi,* hookah, chewing, cigar wrapper, cheroot, burley, Oriental, HDBRG, Lanka, Pikka, Natu, are cultivated under widely differing agro-ecological situations. Further, FCV and Burley tobacco are mainly destined to export market . The area, production, and productivity of tobacco grown in recent years are presented in table 5 and figure-9.

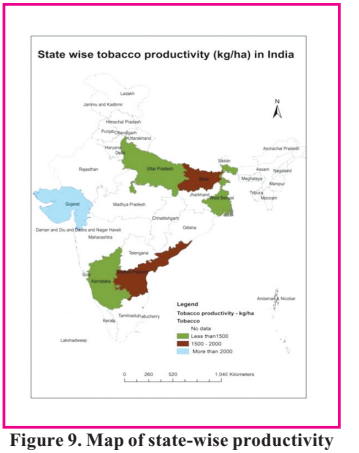


Figure 9. Map of state-wise productivity of tobacco in India (Avg. of 5 years: 2017-2022)

These high-value commercial crops together account for **28.26 lakh ha** of area and **50.04 lakh tons** of production, which contributes significantly to agricultural production and employs millions of farmers in the country. The average productivity of these commercial crops showed a wide variation across major producing states in the country during the last five years. Hence, there is an immense need to augment productivity in states with lower productivity through location specific research and technological interventions.

Table 5: Major tobacco producing states in India

States	Area (lakh ha)	Share (%)	Production (lakh tons)	Share (%)	Productivity (kg/ha)
Total tobacco * (Avg. of 3 years: 2017-2020)					
Gujarat	1.7	42	4.11	51	2401
Andhra Pradesh	0.9	21	1.68	21	1973
Karnataka	0.5	13	0.81	10	1558
Uttar Pradesh	0.7	16	0.87	11	1320
India	**4.1**	**100**	**8.04**	**100**	**1970**
FCV tobacco (Avg. of 5 years: 2017-2022)					
Andhra Pradesh	0.9	62	1.68	68	1718
Karnataka	0.5	38	0.81	32	1195
India	**1.4**	**100**	**2.49**	**100**	**1457**

* includes FCV tobacco and Non-FCV tobacco,
Source: DAC&FW, 2022, Tobacco Board, 2022

Ashwagandha

Ashwagandha is an important medicinal plant that is used in the traditional system of medicine from ancient times. The plant roots have been employed in Indian traditional systems of medicine, Ayurveda, and Unani. In India, it is grown in dry parts in sub-tropical regions of Rajasthan, Madhya Pradesh, Haryana, Gujarat, Maharashtra, Tamil Nadu and Uttar Pradesh (ICAR-Directorate of Medicinal and Aromatic Plants Research). The estimated production of Ashwagandha roots in India is around 4000 tons, with an estimated annual requirement of about 5000 tons. The demand for Ashwagandha is expected to grow in future and hence there is a need to expand area under its cultivation. The demand for Ashwahgandha roots has increased in the domestic market, especially for its alkaloids demand has increased in US and other international markets for neutraceuticals. In recent times, this crop has assumed commercial significance because of the returns it provides to the farmers. CSIR-Central Institute of Medicinal and Aromatic Plants has been promoting Ashwagandha cultivation on a large scale through a bio-village mission mode approach in the semi-arid tropics of the Deccan plateau. This crop is a profitable venture for the farmers and yields more compared to other traditional crop varieties and a new avenue for agri-entrepreneurship can be unlocked by promoting the processing of Ashwagandha roots into powder and extraction of chemical alkaloids for the export market.

Export Status of High-Value Commercial Crops in India

India exports large quantities of high-value crops and generates sizeable foreign exchange revenue for the economy. The export of chilli, turmeric, castor, and tobacco accounts for **16.12 lakh tons** by volume and contributes **Rs 24,477** crores to foreign exchange earnings **(**Table 6). Despite India being an exporter of large quantities of high-value crops, the export orientation of these crops is very low in India, which is indicated by the low share of exports (<35 %). Another peculiar feature with regard to the export composition of these commodities is that the major portion (70-85 %) of exports constitutes more of non-value added exports than value-added exports.

Hence, there is an immense need for India to focus on agro-processing and value addition in these crops to meet the growing demand for value added products in the global market.

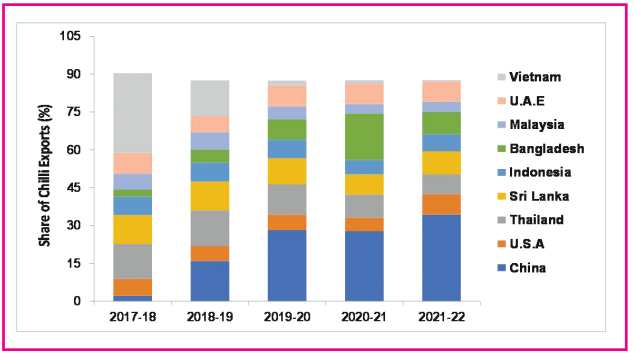
Table 6: Export status of high-value commercial crops during 2021-22

Crops	Export composition of high-value commercial crops					
	Quantity (lakh tons)	Value (Rs. crore)	Share in global exports (%)	Share in production (%)	Non-value added exports (%)	Value added exports (%)
Chilli	5.57	8582	56	27	85	15
Turmeric	1.53	1784	78	11	70	30
Castor	6.90	7805	87	34	84	16
Tobacco	2.12	6306	9	25	83	17
Total	**16.12**	**24477**				

Source: Spice Board, 2022, SEA, 2022 & FAOSTAT, 2022

Dynamics of Export Destinations of High-Value Commercial Crops from India

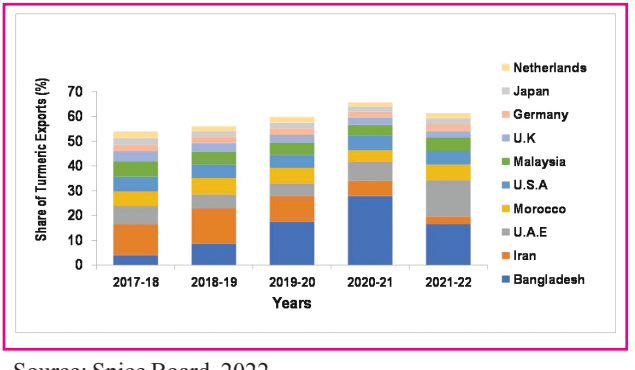
India exports high-value crops to more than 100 destinations across the world. For any agricultural commodity, the difference in comparative advantage, natural resource endowments of the country, geographical proximity, and trade barriers are the major determinants of export destinations. The major export destinations for chilli, turmeric, castor, and tobacco during the last five years are analyzed. The major export markets for chilli are China, USA, UAE, Bangladesh, Thailand, Srilanka, Indonesia, Malaysia and Vietnam. These countries account for nearly 90 % of the total chilli exports of India. However, the export markets for Indian chilli were erratic during the last five years, revealing wide variations from year to year (Figure 10).



Source: Spice Board, 2022

Figure 10. Trends in major export destinations of Indian chilli from 2017-18 to 2021-22

The major export destinations of turmeric are Bangladesh, Iran, Morocco, UAE, USA, UK, Malaysia, Germany, Japan, and the Netherlands, accounting more than 60 % of the total turmeric exports. However, the major export markets for turmeric were inconsistent during the last five years and witnessed wide variations from year to year (Figure 11).



Source: Spice Board, 2022

Figure 11. Trends in major export destinations of Indian turmeric from 2017-18 to 2021-22

The major export destinations of castor oil are China, Netherlands, France, USA, and Japan. These countries account for nearly 80 % of total castor oil exports from India. The major export destinations for

Indian castor oil were more stable during the last five years, indicating very less variations from year to year (Figure 12).

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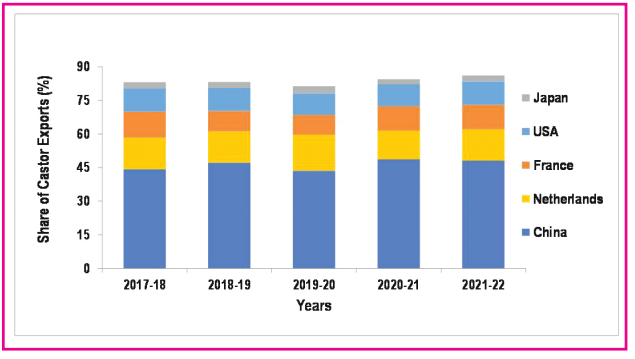
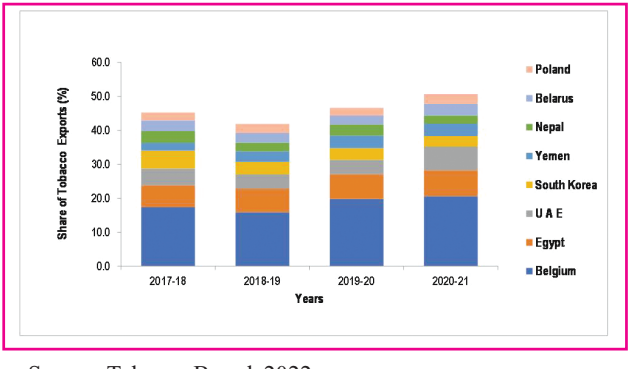


Source: SEA, 2022

Figure 12. Trends in major export destinations of Indian castor oil from 2017-18 to 2021-22

Indian tobacco was exported to more than 100 destinations across the world. The major being Belgium, Egypt, UAE, South Korea, Yemen, Nepal, Belarus, and Poland. Belgium, India's consistent trading partner, has grown over the years, this country accounts for nearly 20 % of India's tobacco exports during the last four years, though there were year-to-year variations. However, other major export destinations were stable during the corresponding period (Figure 13).

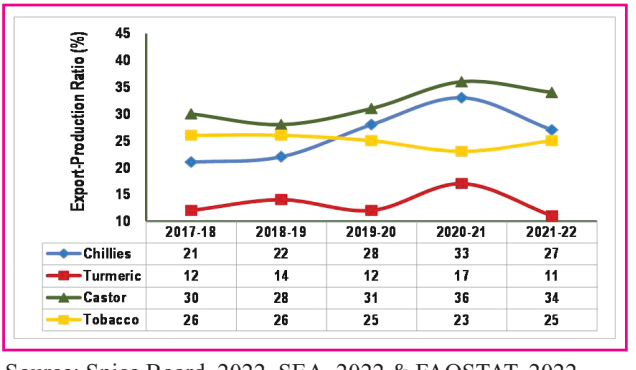


Source: Tobacco Board, 2022

Figure 13. Trends in major export destinations of Indian tobacco from 2017-18 to 2020-21

Export-Production Ratio of High-Value Commercial Crops in India

Export production ratio (E/P ratio) is an indicator of export orientation of any commodity. Though India is the world leader in the export of high-value commercial crops, the export-production ratio (E/P ratio) is very low in these crops. The E/P ratio is analyzed for the selected high-value crops during the last five years and presented in table 10. This ratio for chilli, turmeric, castor, and tobacco ranges from 21-33%, 11-17%, 28-36%, and 23-26% (Figure 14). This implies that in none of these crops, the export accounts for at least 35 % of domestic production from the country. Hence, there is an immense need to enhance the E/P ratio for harnessing maximum export potential. Thus, the future export strategy should focus on enhancing the E/P ratio which is quite doable and would create a tremendous impact on boosting exports through processing and value addition.



	2017-18	2018-19	2019-20	2020-21	2021-22
Chillies	21	22	28	33	27
Turmeric	12	14	12	17	11
Castor	30	28	31	36	34
Tobacco	26	26	25	23	25

Source: Spice Board, 2022, SEA, 2022 & FAOSTAT, 2022

Figure 14. Trends in the export-production ratio (E/P ratio) of high-value crops from 2017-18 to 2021-22

India's competitiveness in high-value cash crops in the context of augmenting agri-exports

In the context of emerging agriculture trends, Indian agriculture is anticipated to flourish in the value chains of high-value commercial crops. India's advantage of commercial crops in global competitiveness, sustainability, ensuring quality needs of the destination markets, and therefore, creating a distinct position is quite feasible. The selected high-value cash crops in India possess some unique attributes, which indicates the export potential of these crops to capitalize on the global markets.

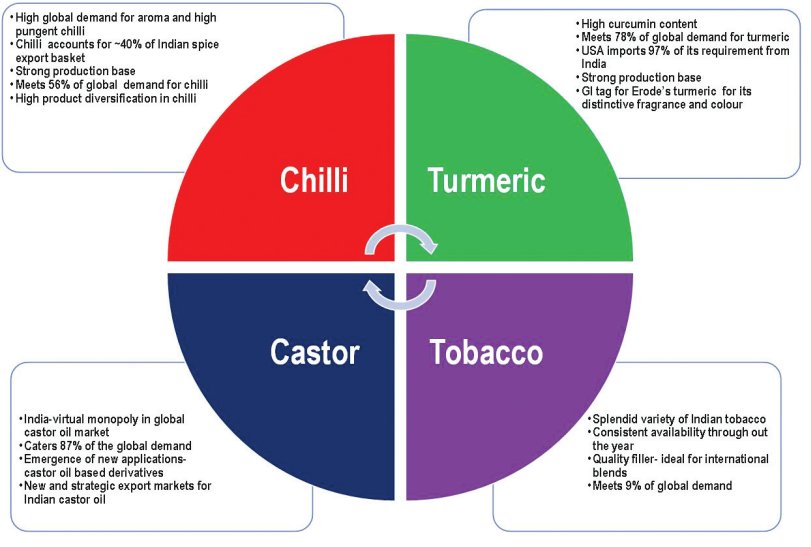


Figure 15. India's competitiveness in selected high-value cash crops

Scope and Opportunities for Processing and Value Addition in High-Value Commercial Crops in India

India primarily exported unmanufactured form of high-value crops and continuously remained as a raw material supplier to the international markets. India lags with regard to the export of processed and value-added commodities compare to agricultural-producing countries in the world. With emerging global agricultural trends, there is a surge in demand for processed, value-added commodities, and secondary agricultural products across the world. On one hand, the low level of value addition and processing, and huge untapped export potential in cash crops on the other, would unlock the incredible opportunity to enhance the export of processed and value-added products in accordance with the growing demand for diversification of products and export baskets in the international markets. India with a strong and diversified agricultural production base, enhancing value addition, agro-processing, and export promotion would transform the landscape of Indian agriculture.

- High-value commercial crops are largely exported in raw bulk form.
- The major portion of production is domestically consumed, which indicates less export orientation
- Low level of post-harvest processing of farm produce in India
- A major chunk of exports in high value commercial crops constitutes unmanufactured/ unprocessed form
- Growing demand for processed and value-added commodities in domestic and international markets
- Inadequate processing and value-added technologies
- The emergence of 'new' applications like castor derivatives and 'new' geographies in the global trade landscape
- Linking Indian farmers to global markets for realizing better prices

Conclusion

The commercial crop sector is gaining momentum in the recent past since agriculture is being treated as an agribusiness industry in the country. From the above analysis, it can be concluded that India enjoys the predominant position in the production and export of chilli, turmeric and castor and stands second position in tobacco. The productivity levels of these high-value crops are low in India compared to other major producing countries. Hence, there is an immense need to bridge the productivity gap through location-specific research and technological interventions.

On export front, India is a leader in export of these crops, the share of exports in production is very low (<35%), which indicates there is a need for more export-orientation in terms of exploring new export markets, product diversification, through processing and value addition to augment export volume and generate additional foreign exchange revenue for the economy. Therefore, it is the need of the hour to give high priority to unlock the growth potential and incentivize processing and value addition, focusing on secondary agriculture, through research and technology development in these crops at national level.

Future Perspectives and Research Priorities for High-Value Commercial Crops

The importance of high value commercial crops is increasing in accordence with the growing demand for them in both domestic and international markets. The key research areas are augmenting productivity, quality, processing, value addition and product diversification to enhance farmers' income and agricultural exports while ensuring the sustainability of agro-ecological assets, the research priorities are furnished below.

- Augmenting crop productivity and farmers' income
- Post-harvest technology and management
- Value chain research to bring commerce into agriculture by shifting research focus to agribusiness
- Development of organized market structure and artificial intellengece based marketing system
- Foster and create linkages with national commodity boards, export agencies, industry, and R&D institutions
- Unlocking opportunities for attracting research grants from external funding agencies and private investment
- Development of commodity outlook models for commercial crops
- Focus on export-centric crops/cropping systems
- Location-specific crop research and knowledge generation

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