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DIRECTION OF TRADE AND COMPETITIVENESS OF CUMIN EXPORTS FROM INDIA

S. Aiswarya[1*], B. Swaminathan[2]

[1]*Assistant Professor, Department of Commerce (Corporate Secretaryship), School of Management Studies and Commerce, Vels Institute of Science, Technology and Advanced Studies, Chennai, Tamil Nadu, India*

[2]*Associate Professor, Department of Agricultural Economics, College of Agriculture, Junagadh Agricultural University, Gujarat, India.*

**Corresponding Author*

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India dominates global cumin production but faces challenges in sustaining its competitiveness due to fluctuating yield levels, export instability, and quality-related rejections. This study examines the direction of trade and competitiveness of cumin exports from India using a comprehensive analysis over a 30-year period (1991–92 to 2020–21). The research employs various analytical tools including growth and instability indices, Markov chain analysis, gravity model estimations, and measures such as Revealed Comparative Advantage (RCA) and Nominal Protection Coefficient (NPC). The findings reveal that while India has a strong comparative advantage in cumin production (RCA = 18.44), its price competitiveness is diminishing (NPC nearing 1), largely due to rising domestic prices and lack of alignment with global quality standards. Export volume rather than price is driving trade performance, and India's trade concentration is skewed towards select partners, with limited penetration into high-value markets. Besides, the gravity model emphasizes the role of GDP and trade openness of importing countries over geographical distance. Overall, the study suggests that enhancing yield through improved agricultural practices, adopting stringent quality controls, and expanding market outreach are critical for India to retain its leadership in global cumin exports.

KEYWORDS: ***Cumin exports, trade competitiveness, comparative advantage, India.***

INTRODUCTION

As cumin is predominantly grown in semi-arid and arid zones in India with resource-poor farm conditions, they are nothing short of a lifeline to the resource-poor farmers. Cumin is also fast becoming popular the world over especially after the Syrian crisis coupled with a general fall in its production in Turkey and Iraq. On the other hand, cumin cultivation is highly preferred in India for its profitability and short duration (Adarsh *et al*., 2023). As Rajasthan and Gujarat together account for 80 per cent of the total cumin production in India (Bairwa *et al*., 2023), there are great prospects for harnessing the comparative advantage of cumin in these regions. An economic investigation of the growth and instability of cumin exports will apart from tracking the success achieved may also outline the gaps that need to be fulfilled to maintain the competitive edge of India in the world. In the present study, growth rates, instability, sources of output growth, and export competitiveness of cumin exports are carried out to equip decision-makers and planners with first-hand knowledge in formulating suitable plans. Accordingly, the objectives of the study are as follows: (i) To compute decade-wise growth and instability of cumin exports from India in terms of export volume, value, and prices; (ii) To estimate the sources of growth and variability of cumin exports from India; (iii) To analyze destination pattern and retention shares of major cumin importing partners of India over the study period; (iv) To compute competitiveness of cumin exports from India; (v) To study the direction of trade of cumin exports from India.

METHODOLOGY

The study was conducted using secondary data pertaining to cumin seed exports (HS code:090930) for the study period from 1991-92 to 2020-21. Further, the study period was categorized into Period I (1991-92 to 1999-2000); Period II (2000-01 to 2009-10); Period III (2010-11 to 2020-21) and Overall Period (1991-92 to 2020-21) for making suitable discussions.

TOOLS OF ANALYSIS

(i) Growth rate and instability analysis

The compound growth rate was used to analyze the performance of cumin exports from India using the following functional form as used by many other researchers including Singh and Goyal (2005):

$Y_t = ab^t$

Where:

Y_t = Dependent variable (growth and export indicators of cumin seed);
t = Time variable in years taking the value of 1, 2, 3,...,n;
a = Intercept;
b = Regression coefficient (1+r);

(ii) Instability indices

Instability indices were computed using Cuddy Della Valle Index with the following formula:

$$\textbf{Instability Index (\%)} = \textbf{CV}\sqrt{(\mathbf{1} - \bar{R}^{\mathbf{2}})}$$

Where:

CV = Coefficient of variation of cumin(growth and export indicators);

$\bar{R}^2$ = Coefficient of determination from time-trend regression.

(iii) Markov Chain Analysis

The average exports of cumin from India to the importing countries in any period were analyzed using the following algebraic expression of the Markov chain model:

$$E_{jt} = \sum_{i=1}^{n} [Ei_{t-1}] P_{ij} + e_{jt}$$

Where:

E_{jt} = Cumin exports from India to the j^{th} country in the year t;
E_{it-1} = Cumin exports of India (i^{th}country) during the year t-1;
P_{ij} = Probability that exports shift from i^{th} country to j^{th}country;
e_{jt} = Error term which is statistically independent of $E_{it-1;}$ and
n = Number of importing countries of India's cumin exports.

(iv) Gravity Model Estimations

The cumin exports from India to other countries were analyzed using the following specification of Gravity model analysis:

$$\mathbf{lnT_{ijt} = \alpha + \beta_1 lnY_{jt} + \beta_2 lnY_{int} + \beta_3 lnD_{ij} + \beta_4 lnER_{jt} + \beta_5 lnTo_{jt} + \mu_i}$$

Where:

T_{ijt}= Cumin export from India to j^{th} importing country at time t;
Y_{jt}= GDP of the j^{th} importing country at time t;
Y_{int}= GDP of India at time t;
D_{ij}= Aerial distance between India and j^{th} importing country;
ER_{jt}= Real exchange rate of country; and
TO_{jt} = Trade-openness of importing partners.

(v) Revealed Comparative Advantage (RCA)

RCA as a measure of an item's share in the country's export relative to its share in the world was derived by the following specification:

$$\mathbf{RCA_{ij}} = \frac{\mathbf{X_{ij}}/\mathbf{X_i}}{\mathbf{X_{wj}}/\mathbf{X_w}}$$

Where,

RCA_{ij}= Revealed comparative advantage of the i^{th} country's j^{th} Commodity (*i.e.* cumin seeds); X_{ij} = India's export of the j^{th} commodity in a given period 't';
X_i = India's total agricultural exports in a given period 't';
X_{wj}= World exports of j^{th} commodity in a given period 't'; and
X_w = Total world agricultural exports in a given period 't'.

(vi) Nominal Protection Coefficient (NPC)

Nominal protection coefficient (NPC) is defined as the ratio of the domestic price to the world reference price of the commodity under consideration. In the study, NPC values were obtained by:

$$\boldsymbol{NPC = \frac{P_d}{P_b}}$$

Where, NPC = Nominal Protection Co-efficient;
P_d = Domestic wholesale price of the cumin; and
P_b= Border price of cumin exports from India

Decision Criterion: If NPC is less than one for any commodity, then the commodity is competitive and is worth exporting (exportable hypothesis) and price uncompetitive in the case of NPC < 1 (importable hypothesis). An NPC greater than one would show that the domestic market price of the commodity exceeds the border price, which discourages the export of that particular commodity.

MAJOR FINDINGS AND DISCUSSIONS

Growth trends, as furnished in Table 1, post an interesting picture of the cumin yield levels in India registering a rise from -3.57 per cent per annum in Period-I to 3.74 per cent per annum in Period II and sliding down a bit to 2.94 per cent per annum in Period-III. Despite the favourable growth trend in cumin yield levels over the years, cumin production in India is more found to be led by acreage (5.74% /annum) than by yield (2.09%/annum) in the overall study period. The country needs to attain higher yield levels to sustain its leadership position in cumin trade. Otherwise, the competition from Syria and Turkey may decline India's share to as low as 25 per cent as existed during Period II if not worse.

Table 1: Growth trends of production and exports of cumin from India

Sl. No.	Growth rate particulars of cumin (%)	Period-I (1991-92 to 2000-01)	Period-II (2001-02 to 2010-11)	Period-III (2011-12 to 2020-21)	Overall Period (1991-92 to 2020-21
		Growth rate (%)			
1.	Area	4.67***	1.85***	6.16***	5.74***
2.	Production	0.93**	5.67***	9.29***	7.97***
3.	Yield	-3.57***	3.74***	2.94***	2.09***
4.	Export volume	25.04**	22.01*	17.50***	18.36**
5.	Export value	31.85**	25.19*	20.54***	24.57**
6.	Export price	5.44***	2.61***	2.59***	5.24***
7.	Domestic price	7.97***	5.79***	2.51***	6.72***
8.	Export share (%)	12.87	23.86	62.83	34.15

Note: ***,**, & * refer to significance at 1%, 5%, and 10%, respectively.

India's share in world cumin exports has increased from 12.87 per cent in Period I to 62.83 per cent in Period III (*vide* Table 1). But there exists only a marginal difference between domestic and export prices in such a way that the exports would not be profitable if not for the export incentives. Not only the domestic prices were found to be on par with the international prices but also the growth rates of domestic prices across the study period were found to be on far with export prices revealing lesser price competitiveness of cumin exports from India. Buragohain and Borah (2022) also reported similar findings regarding the exports of cumin seeds from India.

Similar to growth rates in cumin production, the export value of cumin over the study period is found to be highly decided by export volume than by export price. Even in Period III wherein the country's average share in the world cumin exports was 63%, the growth rate of cumin export price was lower (2.59% per annum) when compared with both its export value (20.54% per annum) and export volume (17.50% per annum) at various levels of significances, as furnished in Table 1. This only shows that India has a poor track record in retaining major export destinations despite being the only large country left to feed the global supply chain of cumin in recent years. Unlike Syria and Turkey wherein 90 per cent of domestic cumin production is exported, India's domestic markets alone absorb at least 75 per cent of cumin supply. As the domestic prices are found to be only marginally lower than the export prices, the farmers lack incentives to produce as per the needs of the world market. As a result, Syria, Turnkey, and other minor producing nations of cumin including UAE and Russia are referred for international prices for cumin and India continues to be the only price taker despite its huge export potential.

Table 2: Instability indices of production and exports of cumin from India

Sl. No.	Instability particulars of cumin (%)	Period-I (1991-92 to 2000-01)		Period-II (2001-02 to 2010-11)		Period-III (2011-12 to 2020-21)		Overall Period (1991-92 to 2020-21	
		CV%	CDV%	CV%	CDV%	CV%	CDV%	CV%	CDV%
1.	Area	37.43	30.08	28.32	20.31	21.13	13.34	54.92	26.09
2.	Production	39.54	31.81	32.33	26.41	29.55	14.18	78.47	35.19
3.	Yield	17.18	14.17	20.02	17.98	10.32	6.59	24.81	17.82
4.	Export volume	77.01	60.74	77.40	52.35	48.75	22.97	122.48	67.79
5.	Export value	78.60	56.14	90.18	62.14	50.88	14.41	137.02	77.79
6.	Export price	18.19	12.43	17.10	15.97	12.09	9.70	44.83	15.14
7.	Domestic price	23.32	8.12	21.12	13.62	14.14	12.47	53.65	16.44

As furnished in Table 2, the instability in export indicators of volume, value and per unit price is found to be double than that of growth indicators of area, production and productivity. Cumin exports from India fluctuate as without any great export incentive farmers do not cultivate keeping the quality requirement of export markets in mind. Produce quality is compromised and export lot rejections continue to be unabated. Much recently, China rejected nearly 70,000 tonnes of cumin exports from India citing excess pesticide residues.

Table 3: Growth dynamics of cumin cultivation in Gujarat

Sl. No.	Growth rate particulars of cumin (%)	Period-I (1991-92 to 2000-01)	Period-II (2001-02 to 2010-11)	Period-III (2011-12 to 2020-21)	Overall Period (1991-92 to 2020-21
1.	Area	1.84***	10.19***	1.87***	5.98***
2.	Production	1.73***	15.99***	5.79***	9.82***
3.	Yield	-0.09***	5.26***	3.83***	3.62***
4.	Supply Share (%)	48.43	58.47	60.00	55.63

Note: ***, **, and * indicate significance at 1%, 5%, and 10% probability levels, respectively.

On the contrary, cumin production in Gujarat is found to be more yield-driven (Table 3) and the variability in growth indicators of area, production and productivity are also found to be lesser than that of India as a whole. But for the state to keep its supply share of more than 60 per cent intact, subsidized adoption of improved cultivars and micro-irrigation practices should be promoted on a large scale. Several farmer producer organization can be facilitated under the 'One District, One Product (ODOP)' scheme ensuring greater adoption of good agricultural and marketing practices in the state.

Table 4: Instability indices of cumin cultivation in Gujarat

Sl. No.	Growth rate particulars of cumin (%)	Period-I (1991-92 to 2000-01)		Period-II (2001-02 to 2010-11)		Period-III (2011-12 to 2020-21)		Overall Period (1991-92 to 2020-21	
		CV%	CDV%	CV%	CDV%	CV%	CDV%	CV%	CDV%
1.	Area	22.24	22.24	32.60	17.98	17.89	17.89	51.74	23.78
2.	Production	21.01	21.01	54.25	30.46	21.72	14.76	80.15	34.65
3.	Yield	13.69	13.69	21.79	16.64	13.13	8.18	36.42	18.43

Among the country's major importing partners, as portrayed in Table 5, Nepal was found to be the most loyal partner of the last decade during 2011-12 to 2020-21 retaining 89 per cent of its cumin imports from India followed by Bangladesh (42%), Egypt (40%) and UAE (25%). The present findings refurbish the findings of Rabadiya (2019) who also showed limited retention of India's exports by the USA and European nations and a large section of trade happening only with the neighbouring destination partners or with the countries with significant overseas Indian population. This only shows that the premium markets in the world like that of the USA, the UK and other European countries and the world's leading cumin importers such as China, Vietnam and Japan continue to deal with India only as an alternate option for their cumin imports and look up to India only the global cumin supply dries up. The uncompetitive export price of India, when compared to that of Turkey and Syria, is the single most important reason behind this worrisome scenario. Besides, the rejection of the country's export lots over pesticide residues might also be the reason for the high-end markets displaying lesser retention of past imports. This finding is in line with that of Kumar and Muraleedharan (2007) who revealed in their study on SPS measures for spice exports the unaddressed constraints encountered by the Indian exporters.

Table 5: Retention shares of India's cumin exports by major trading partners

Importing partner	USA	Nepal	Bangladesh	UAE	Egypt	Vietnam	Others
USA	0.2292	0.0005	0.0934	0.2527	0.2571	0.0449	0.1222
Nepal	0.0004	0.8902	0.1002	0.0002	0.0002	0.0087	0.0001
Bangladesh	0.1246	0.0101	0.4167	0.0416	0.1962	0.1072	0.0976
UAE	0.0491	0.2146	0.4644	0.2503	0.0001	0.0166	0.0049
Egypt	0.0001	0.0047	0.0001	0.5862	0.4002	0.0087	0.0000
Vietnam	0.0005	0.0092	0.6949	0.0138	0.0092	0.2008	0.0716
Others	0.0044	0.0024	0.0128	0.0078	0.0033	0.0169	0.9524

With the domestic prices almost closer to their international counterpart, the current values of NPC which were 0.72, on an average, during Period I have increased to 0.94 in Period III indicating that the cumin export prices of India have largely become uncompetitive in recent years (Table 6). It would take only a matter of years for Iraq, Syria, Turkey and other minor cumin producers to eat up into India's cumin trade share and take it down to below 10 per cent level as was the case in Period I. Boosting domestic yields to cool down domestic prices and cutting down the cost of cultivation through large-scale adoption of IPM practices are the only way forward for India to remain competitive in cumin trade.

Despite India being among the top ten importers of cumin seed with 30 per cent more imports in the last five years than the previous five years combined and the imports of 2020-21 crossing 7.07 thousand tonnes and valued over Rs. 109 crores, the country's revealed comparative advantage (RCA) value for the overall period was found as high as 18.4. Though the RCA values work out in favour of the country's advantage, the higher values of NPCs reveal that India has a comparative advantage in cumin production but not a competitive advantage in overall cumin trade. Thomas and Sanil (2019) come up with similar discussions in their review paper on competitiveness in spice exports from India.

Table 6: Comparative advantage and competitiveness of India's cumin exports

Sl. No.	Competitive measures	Period-I (1991-92 to 2000-01)	Period-II (2001-02 to 2010-11)	Period-III (2011-12 to 2020-21)	Overall Period (1991-92 to 2020-21
1.	NPC	0.72	0.88	0.94	0.85
2.	RCA	12.38	15.89	27.03	18.44
3.	RSCA	0.84	0.84	0.92	0.87

As furnished in Table 7, the Gravity model results show that the Indian cumin exports are attracted towards the countries with the higher gross domestic product and the direction of the cumin trade exports are not favourable with those of the distant countries. But the magnitude of the effect of the distance variable, ln Distance, (-0.43%) is less pronounced and non-significant. On the other hand, the gross domestic product of India, ln GDP-IN, (1.56 %) and that of the trading partners, ln GDP-j (7.29%) and trade openness ratio of the major importing partners, ln TO, have a larger role in determining cumin exports from India. At the same time, the negative sign of distance variable could only mean India's limitation in identifying new trading partners for cumin exports and that is why the country's exports are concentrated only to a few markets and it is high time for the country to reverse the trend.

Table 7: Estimates of Gravity model for cumin exports from India

Trade indicators	Coeff.	SE	Z-value
ln GDP of trading partner	7.29***	1.28	5.70
ln GDP of India	1.56*	0.87	1.79
ln Real exchange rate	0.29***	0.05	5.80
ln Distance b/w India & partner	-0.43	3.39	-0.13
ln Trade-openness	2.65**	1.11	2.39
Constant	-3.89	7.62	-0.51
Wald chi^2 (6) = 88.19***, Prob > chi^2 = 0.00 and log likelihood = -117.05			

Note: ***, **, * indicate significance at 1%, 5% and 10% levels, respectively.

CONCLUSION

India has amassed more than 60 per cent share, on an average, in the world cumin trade and Gujarat continues to be the major cumin supplier in the country. Growth rate estimations of the present study have revealed negative and significant yield trends only in Period I and all the other periods have reported positive and significant trends across the production and trade indictors. However, the growth rates of acreage and that of export volume are reported to be higher than their yield and export unit price counterparts which happens to be a worrying trend. In addition, the fluctuations in export volume and value are more pronounced than the growth indicators as the exports are challenged by limited exportable surplus suiting the quality requirements of the importing nations coupled with higher domestic prices. On the other hand, the RCA values are higher assuring India's comparative advantage in production. But the NPC values are closer to one indicating lesser price competitiveness that ultimately might diminish India's export share in the long run. The findings of the Gravity model indicate that more than the distance factor, the GDP and trade openness of the trading partners play a larger role in determining cumin exports from India. Thereby, higher yields of marketable quality have to be targeted enabling the country to generate a genuine exportable surplus for retaining its market share and to make long-term contracts with high-end markets.

Policy Implications

The comparative advantage of India, and particularly Gujarat, can be enhanced in cumin exports and the country can emerge as a price setter in the world cumin trade only when the issues around yield, quality, and prices are addressed institutionally. Higher yield levels should be sustained, through widespread adoption of improved cultivars and micro-irrigation practices, for reducing production and export instabilities and to cool down domestic prices. Mandating large-scale IPM strategies and pre-shipment quality checks are needed for curtailing export rejections. Above all, production and export incentives should be channelized through FPOs for upscaling residue management practices leading to a genuine exportable surplus.

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