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Performance of small cardamom export from India

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Abstract

Small cardamom, the queen of spices, plays an important role in India's economy due to robust domestic demand and increasing price. However, the export of the spice witnessed huge decline and it became more of domestic market oriented. In recent years, the export of small cardamom from India was found to be increasing steadily. The present study was conducted to analyse the export performance of small cardamom from India in terms of export growth rate and instability, sources of growth and variability in export value and the geographic concentration of export. During the pre-WTO period, the growth rates in terms of export value, quantity and unit value were found to be negative, while the instability in export was high. Post-WTO period recorded positive and higher growth rate and comparatively lower instability in export. Among the different periods under study, lower growth rate and higher instability were observed during Period II which could be the result of increased domestic demand and stiff competition in international market especially from Guatemala. Change in mean export unit value was found to be the major source of growth in value of export during both pre- and post-WTO periods, while the change in variability of export unit value contributed more to the change in variance of export value. The geographic concentration of export increased in post-WTO period compared to pre-WTO period and the exports were more concentrated towards the Middle-East countries. Higher cost of production, domestic market orientation and Non-Tariff Barriers were the major issues that need to be addressed to strengthen the export markets and improve the performance of small cardamom export from India.

Keywords: Export, Geographic concentration, Growth, Instability, Small cardamom

Introduction

Spices are a major source of foreign exchange for the country, but as a result of the provisions of WTO and globalization, the intensity of competition faced by Indian spices continues to increase. All the categories of spices exporters, irrespective of scale of operation, form of business or experience levels, are affected adversely due to the competition in the international market (George and Cherian, 2017).

Cardamom (*Elettaria cardamomum*), the aromatic queen of spices, is one of the oldest and most expensive spices in the world. Indian cardamom is known worldwide for its superior quality and is exported to various countries. The well-known grades of Indian cardamom in the International market are AGEB - Alleppey Green Extra Bold Cardamom, AGB - Alleppey Green Bold Cardamom and AGS - Alleppey Green Superior Cardamom. In India, Kerala accounts for the major share in cardamom cultivation, followed by Karnataka and Tamil Nadu.

India formerly monopolised the production and export of small cardamom in the world, but currently occupies the second position with an annual production of 22,000 tonnes and an export of 5,500 tonnes in 2015-16 (Spices Board, 2016). Guatemala leads as the largest producer with an average annual production of 38,000 tonnes in 2015-16 and it emerged as the largest exporter of small cardamom in the world. Moreover, India witnessed a gradual decline in the export intensity of production from 69 per cent in 1972-73 to 27.5 per cent in 2017-18,

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even though there was fivefold increase in production. India is also found struggling to hold its position in the dominant Middle East market, which was once ruled by Indian cardamom, due to the competition from cheaper Guatemalan cardamom. India failed to ensure stable markets for its cardamom export when it lost its share of world market to its competitor (Choubey, 2017) and it experienced unfavourable export condition due to less competitiveness (Bhalla, 2004).

In this backdrop, the present study attempts to evaluate the performance of small cardamom export from India for the years from 1970-71 to 2017-18 in terms of growth rate, instability, geographic concentration and the sources of growth and variability in export of small cardamom from India.

Materials and Methods

Data source

Time series data pertaining to the period from 1970-71 to 2017-18 were analysed in the study. Data were mainly collected from Spices Board, Kochi. Analysis was done by dividing the study period into pre-WTO period from 1970-71 to 1994-95, post-WTO period from 1995-96 to 2017-18, over-all period from 1970-71 to 2017-18 and different decades *viz.*, Period I from 1970-71 to 1979-80, Period II from 1980-81 to 1989-90, Period III from 1990-91 to 1999-00, Period IV from 2000-01 to 2009-10 and Period V from 2010-11 to 2017-18.

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Analysis of growth in export

The growth rates measure the past performance of the economic variables. Growth rates were estimated to find out the trend in the export of small cardamom from India for the period from 1970-71 to 2017-18. The compound growth rate was measured by fitting an exponential function for the variables *viz*., export quantity, export value and unit value (Gujarati and Sangeetha, 2007). The exponential growth function of the form,

$$Y = ab^t e_t$$

where,

Y = Dependent variable for which growth rate is to be estimated

a = Intercept

b = Regression co-efficient

t = Time variable

e = Error term

The compound growth rate was obtained from the logarithmic form of the exponential equation as below

$$\ln Y = \ln a + t \ln b$$

Then, the compound growth rate (r) was computed by using the relationship

$$r = \text{Anti ln of } (b - 1) \times 100$$

The compound growth rates were tested for their significance by the statistics given by

$$t = r / SE(r)$$

where,

$$SE(r) = [100\ b \times SE(\ln b)] / \ln e$$

Decomposition analysis

In order to find out the sources of growth in export value, the Hazell's (1982) decomposition model was employed. The export quantity and export unit values were first detrended using the linear relations of the form

$$z_t = a + b + e_t$$

where,

z_t = dependent variable (export quantity and export unit value)

t = time variable, and

e_t = random variable residual with zero mean and variance σ^2

After detrending the data, the residuals were centred on the export mean, export quantity and export unit value resulting in the detrended time series data of the form

$$z^*_t = e_t + \overline{Z}$$

where,

$\overline{Z}$ = mean of export quantity/unit value

z^*_t = detrended export quantity or unit value

The series of export quantity (Q) and unit value of export (P) were divided into two sub-periods, *viz.,* 1970-71 to 1994-1995 and 1995-96 to 2017-2018. The components of average export value

were estimated as:

$EV = \bar{Q}_I\Delta\bar{P} + \bar{P}_I\Delta\bar{Q} + \Delta\bar{Q}\Delta\bar{P} + \Delta Cov\,(\bar{Q},\bar{P})$ (Method I) or

$= \bar{Q}_{II}\Delta\bar{P} + \bar{P}_{II}\Delta\bar{Q} + (-\Delta\bar{Q}\Delta\bar{P}) + \Delta Cov\,(\bar{Q},\bar{P})$ (Method II)

where,

$\bar{Q}_I$ = Average of export quantity in first period

$\bar{Q}_{II}$ = Average of export quantity in second period

$\bar{P}_I$ = Average of unit value of export in first period

$\bar{P}_{II}$ = Average of unit value of export in second period

$\Delta\bar{Q}$ = Change in export quantity $(\bar{Q}_{II} - \bar{Q}_I)$

$\Delta\bar{P}$ = Change in unit value of export $(\bar{P}_{II} - \bar{P}_I)$

Accordingly, the components of change in average export value were estimated as shown in Table 1.

Analysis of export instability

Instability in export is expected to hamper the process of economic development. This analysis was used to find out the fluctuations in export of small cardamom from India during 1970-71 to 2017-18. To study the export instability, Coppock's instability index (Coppock, 1966) was used to estimate the variation in the export of small cardamom which, algebraically is expressed as the following estimable form:

$$V\log = \frac{1}{N-1}\sum\left\{log\left(\frac{X_{t+1}}{X_t}\right) - m\right\}_2$$

Instability index = (antilog $\sqrt{V\log} - 1$) x 100

where,

Xt = Value of exports in year t or volume of exports in year t

N = Number of years

m = Arithmetic mean of the difference between the logs of Xt and Xt+1 etc.

V log = Logarithmic variance of the series

Concentration in the Exports of Cardamom

Geographic Concentration – Hirschman Index

Increased geographic concentration increases the instability and thereby the risks in export earnings. The Hirschman Index was used to measure the geographic concentration in the export of the commodity (Sarada et al., 2006).

$$\text{Hirschman Index, HI} = 100\sqrt{\sum_{i=1}^{n}\left(\frac{X_{it}}{X_t}\right)_2}$$

where,

X_{it} = the value of exports of commodity from India in year t to the i^{th} market

X_t = the total value of export of the commodity from India in year t

n = the number of countries importing the commodity from India

The squaring of each commodity's share in total earnings prior to summation is designed to place greater weights on the more important export items. The highest value of the coefficient is 100, which occurs when a country exports only to one market. When the value of the Hirschman coefficient is lower, the greater is the number of export markets and the more even is the distribution of proceeds among these countries**.**

Result and Discussion

Growth rate

The exponential growth function was used to evaluate the export performance of small cardamom from India with respect to its growth in terms of quantity, value and unit value for the period from 1970-71 to 2017-18. The results are presented in Table 2.

Table 1. Components of change in average export value of small cardamom

Source of change in export	Component of change		
Description	Symbol	Method I (%)	Method II (%)
Change in mean export unit value	$\Delta\bar{P}$	$\bar{Q}_I\Delta\bar{P}$	$\bar{Q}_{II}\Delta\bar{P}$
Change in mean export quantity	$\Delta\bar{Q}$	$\bar{P}_I\Delta\bar{Q}$	$\bar{P}_{II}\Delta\bar{Q}$
Interaction between change in mean quantity and mean unit value	$\Delta\bar{P}.\Delta\bar{Q}$	$\Delta\bar{Q}\Delta\bar{P}$	$-\Delta\bar{Q}\Delta\bar{P}$
Change in quantity - unit value covariance	$\Delta Cov(Q,P)$	$\Delta Cov(Q,P)$	$\Delta Cov(Q,P)$

Table 2. Growth rate of Indian small cardamom export

Year		Quantity (kg)	Value (₹)	Value ($)	Unit Value (₹/Kg)	Unit Value ($/kg)
Pre-WTO	GR	-8.61	-2.19	-7.80	7.03	0.88
	SE	4.16	5.38	5.58	2.42	2.67
	Sig	-0.48	-2.46	-0.71	0.34	3.02
Post-WTO	GR	12.82	18.66	15.78	5.18	2.62
	SE	3.97	5.31	4.79	2.07	1.91
	Sig	0.31	0.28	0.30	0.40	0.73
Period I	GR	4.64	25.75	24.05	20.18	18.55
	SE	9.25	12.24	12.63	7.36	6.83
	Sig	1.99	0.48	0.53	0.36	0.37
Period II	GR	-17.76	-18.37	-24.18	-0.75	-7.81
	SE	19.84	19.92	18.15	6.68	5.51
	Sig	-1.12	-1.08	-0.75	-8.96	-0.71
Period III	GR	3.84	9.45	1.08	5.40	-2.66
	SE	11.04	11.78	11.84	5.46	4.89
	Sig	2.87	1.25	10.93	1.01	-1.84
Period IV	GR	-1.04	-0.16	0.38	0.89	1.44
	SE	11.24	17.21	16.53	8.49	7.88
	Sig	-10.77	-106.71	43.31	9.52	5.47
Period V	GR	16.27	17.89	11.51	1.39	-4.09
	SE	16.21	11.47	11.65	5.83	6.81
	Sig	1.00	0.64	1.01	4.18	-1.66
Overall period	GR	0.59	6.58	0.92	5.95	0.33
	SE	2.30	2.57	2.70	0.81	0.87
	Sig	3.92	0.39	2.93	0.14	2.63

Note: Pre-WTO: 1970-71 to 1994-95; Post-WTO: 1995-96 to 2017-18; Period I: 1970-71 to 1979-80; Period II: 1980-81 to 1989-90; Period III: 1990-91 to 1999-00; Period IV: 2000-01 to 2009-10; Period V: 2010-11 to 2017-18; Over all period: 1970-71 to 2017-18.

Even though both quantity and value of exports displayed negative growth rates during the pre-WTO period, the rate of decline in export value was lower than that of export quantity as the prices were increasing, which was evident from the positive growth rate of export unit value. From the table it could be observed that there was positive growth rate in terms of quantity, value and unit value of export during the post-WTO period. Period I recorded higher growth rate of export in terms of value and unit value compared to other periods. Period II witnessed lowest and negative growth rate of export as a result of increased domestic demand in India and flow of cheaper cardamom from Guatemala into international market. During period III (from 1990-91 to 1999-00), exports started to increase gradually thus recording positive growth rate, which could be attributed to trade and tariff liberalisation. But the succeeding decade (Period IV) again witnessed a negative growth rate in terms of quantity and value, but still exhibiting a positive growth in price of the commodity. The small cardamom export from India started to recover from 2011-12 and it could be observed from the table that highest export growth rate in terms of quantity was achieved during Period V, which also witnessed second highest growth rate of export value and this could be attributed to lower production and thus deficiency in supply of cardamom from the world's largest exporter, Guatemala.

One of the major factors that affected the Indian small cardamom export was the increase in domestic demand, which in turn led to the increase in annual average domestic price. From Figure 1, it could be observed that the quantity of export of small cardamom declined with increase in average annual domestic price, even though there was an increase in the international price as represented by the increase in unit value and value of export. Thus, it could be inferred that the increase in demand and price in domestic market caused the reduction in export quantity of small cardamom from India and the increase in value of small cardamom export was

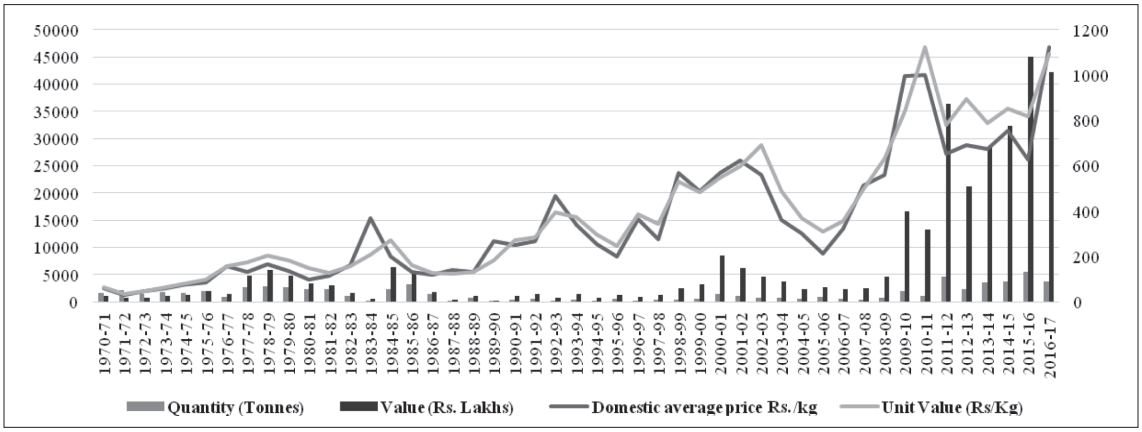

Figure 1. Comparison between domestic market price and export of small cardamom from India

solely due to the increase in unit value of export.

Decomposition analysis

Change in average export value of small cardamom was attributed to change in mean export unit value and quantity, their interaction and the change in quantity-unit value covariance. Hazell's decomposition model was employed to study the contribution of each component of change.

It was the mean export unit value that remained (Table 3) as the major component of change in average export value of small cardamom during both pre- and post-WTO periods and also during the over-all period from 1970-71 to 2017-18. It could be witnessed from the table that change in mean export quantity attributed more towards the variability in average export value during Period I (55.38 per cent) and Period V (162.92 per cent),

Table 3. Decomposition analysis of components of change in average export value of small cardamom

Description	Change in mean EQ	Change in mean EUV	Interaction between change in mean EQ and mean EUV	Change in EQ-EUV covariance
Pre-WTO	21.72	78.34	-0.052	-0.004
Post-WTO	25.11	74.8	0.063	0.023
Period I	55.38	44.61	0.007	-0.003
Period II	9.76	90.27	-0.025	-0.011
Period III	2.41	97.59	-0.001	-0.002
Period IV	2.35	97.67	-0.005	-0.022
Period V	162.92	-63.26	-0.047	0.388
Over all period	41.59	58.6	-0.008	-0.187

Table 4. Components of change in variance of export value

	Pre-WTO & Post-WTO	Period I & Period II	Period II & Period III	Period III & Period IV	Period IV & Period V
Change in mean export unit value	-0.0004	-0.02	-0.003	3.03E-05	-0.07
Change in mean export quantity	-0.006	-0.005	0.20	0.005	-0.48
Change in export unit value variance	84.65	69.12	30.59	90.13	52.71
Change in export quantity variance	3.03	6.75	18.26	0.46	-7.77
Interaction between changes in mean EUV and mean EQ	2E-08	8E-07	1E-06	1E-08	-8E-05
Change in export quantity - export unit value covariance	12.36	24.32	51.04	9.37	55.16
Interaction between changes in mean EQ and EUV variance	-0.01	-0.05	-0.04	0.02	0.13
Interaction between changes in mean EUV and EQ variance	-0.0001	-0.04	0.001	-0.0004	-0.06
Interaction between changes in mean EQ and EUV and changes in EQ-EUV covariance	-0.001	-0.07	-0.03	-0.003	0.29
Change in residual	-0.01	-0.02	-0.03	0.009	0.10

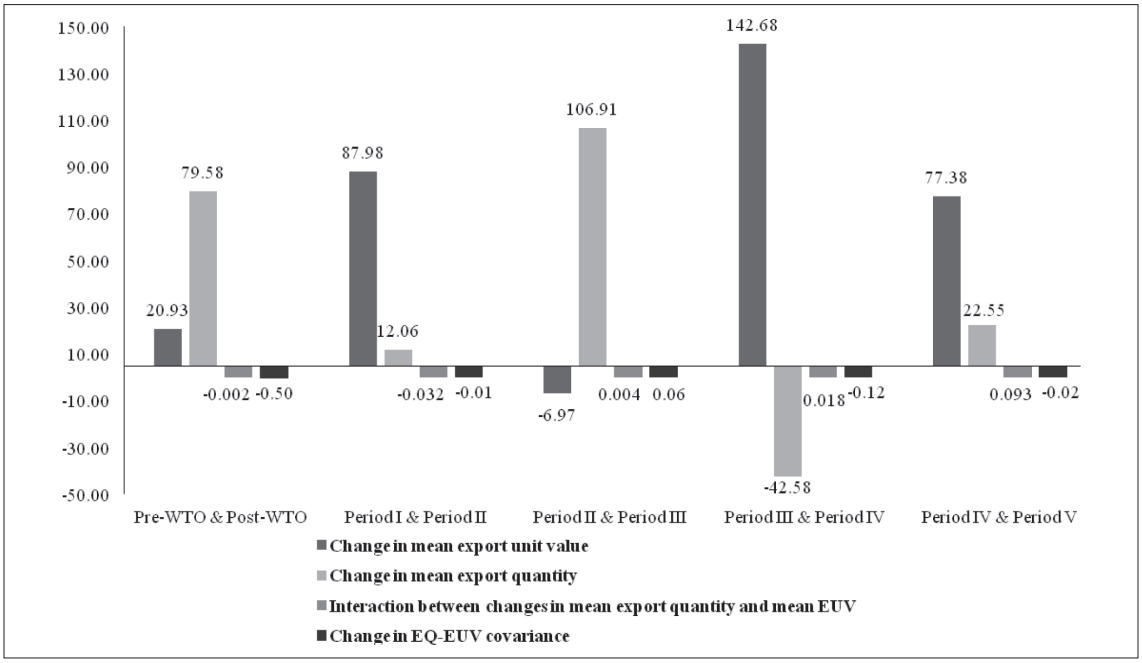

Figure 2. Decomposition of sources of growth in small cardamom export value

while the contribution of mean export unit value was negative (-63.26 per cent) in Period V, indicating its effect in reducing the instability of export value to an extent of 63 per cent. The effects of other components *viz*., interaction effect and effect of quantity-unit value covariance on change in value of export were minimum and negative during pre-WTO and over-all periods, while it was positive during the post-WTO period.

Source of variance in export value

The stability in the value of small cardamom export was assumed to be affected by ten components of change as shown in Table 4. Nearly 85 per cent of increase in the variance of export value in the post-WTO period as compared to the pre-WTO was attributed to the change in variability of export unit value, followed by a contribution of 12 per cent by change in export quantity-export unit value covariance. Change in export unit value variance was the major factor that contributed to the change in variance of value of export between Period I and Period II (69 per cent) and between Period III and Period IV (90 per cent), while the change in export quantity-export unit value covariance was the major contributor to the change in unit value variance between Period II and Period III (51 per cent) and between IV and V (55 per cent). Change in export quantity variance was the third major contributor and it was found to have a stabilising effect between Period IV and Period V, as it reduced the instability of export value variance to an extent of 7.77 per cent. The influence of other factors on the change in variability of value of small cardamom export was found to be minimum i.e., less than one per cent.

The result implies that the price of the commodity was more influential in bringing about change in the export value and played a major role in destabilising the value of small cardamom export from India.

Export instability

Instability in the export of small cardamom from India in terms of quantity, value (in $ and ₹) and unit value (in $/kg and ₹ /kg) was estimated using Coppock's instability index and the results are presented in Table 5.

Table 5. Instability in export of small cardamom from India

Year	Quantity (Kg)	Value (₹)	Value ($)	Unit Value (₹/Kg)	Unit Value ($/kg)
Pre-WTO	141.87	145.33	145.03	29.99	28.51
Post-WTO	70.11	62	59.93	25.67	25.27
Period I	60.33	57.11	58.73	30.13	28.57
Period II	223.63	223.8	216.16	28.36	25.64
Period III	80.78	65.02	67.28	27.14	24.5
Period IV	51.11	63.39	60.12	25.02	23.92
Period V	76.53	50.3	53.22	19.76	21.08
Overall period	110.59	108.05	107.26	28.28	27.44

It could be observed from the table that small cardamom export from India was more unstable during pre-WTO period compared to post-WTO period as the restriction for trade in the post-liberalisation period was comparatively low. There was a decline in instability from Period II to Period V. It was during the Period II that the instability in terms of quantity and value of export was very high and witnessed notably lower and negative export growth rates in terms of quantity, value and unit value. Thus, the higher instability in Period II could be a result of increased domestic demand and stiff competition from Guatemala. Instability in export quantity was minimum in Period IV, while Period V recorded minimum instability in terms of export value and unit value. Overall, as compared to quantity and value of export, instability in terms of unit value of export was less as visible from the trend in Fig. 3. From the analysis it could be concluded that the fluctuation in terms of value, quantity and unit value of export of Indian small cardamom had reduced after liberalisation i.e., during the post-WTO period, and it was the fluctuation in export quantity than that in price which affected the stability in export earnings.

Geographic concentration

The results of geographic concentration measured using Hirschman Index are presented in Table 6. As seen in the table there was not much variation in the geographic concentration of small cardamom export from India and it always remined above 50 per cent, denoting higher level of concentration and uneven distribution that could result in higher instability and risk in export earnings. Geographic concentration was more in post-WTO period than in pre-WTO period. It could be observed that over the period of time from Period I to Period V there was a steady and gradual increase in the geographic concentration of small cardamom export from India. Post-WTO period exhibited wide variation and highly increasing trend in geographic concentration of Indian small cardamom export compared to the pre-WTO period (Figs. 4, 5 and 6). It could be

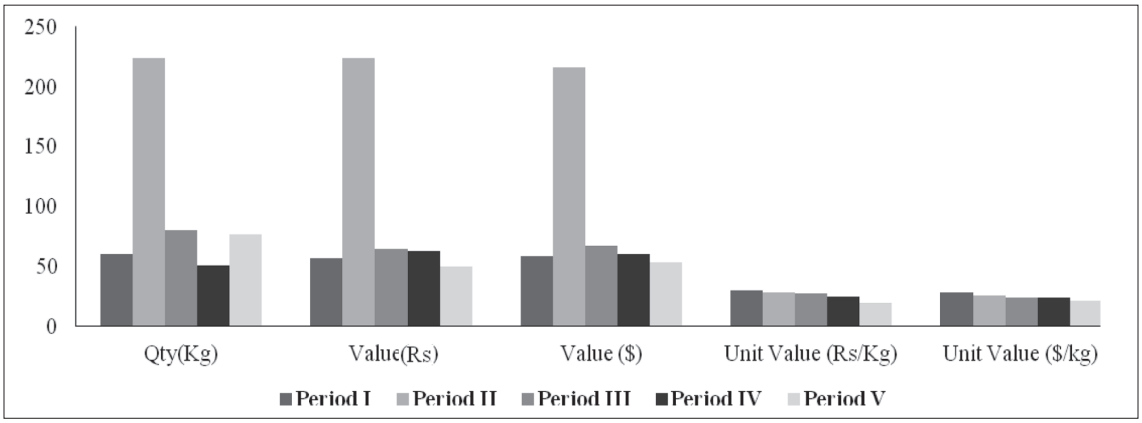

Figure 3. Instability in export of small cardamom

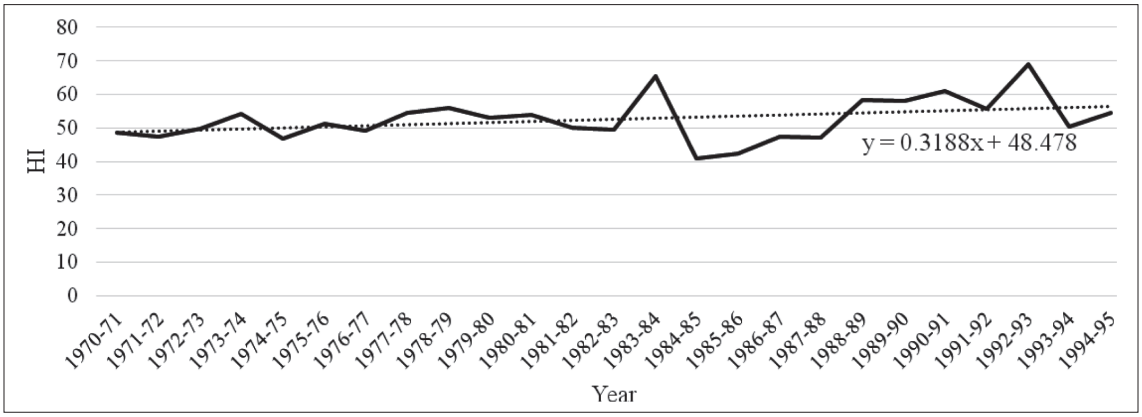

Figure 4. Trend in geographic concentration of small cardamom export from India during pre-WTO

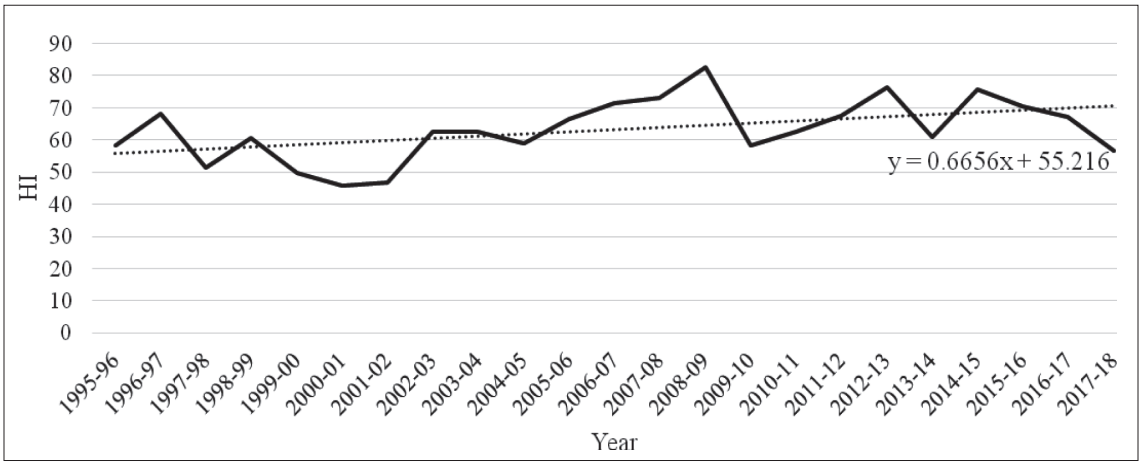

Figure 5. Trend in geographic concentration of small cardamom export from India during post-WTO

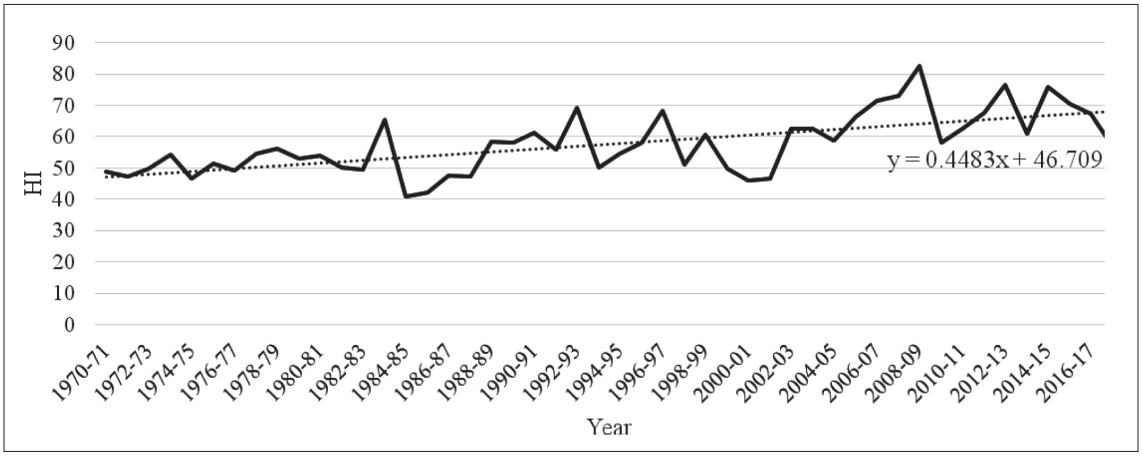

Figure 6. Trend in geographic concentration of small cardamom export from India during overall period from 1970-71 to 2017-18

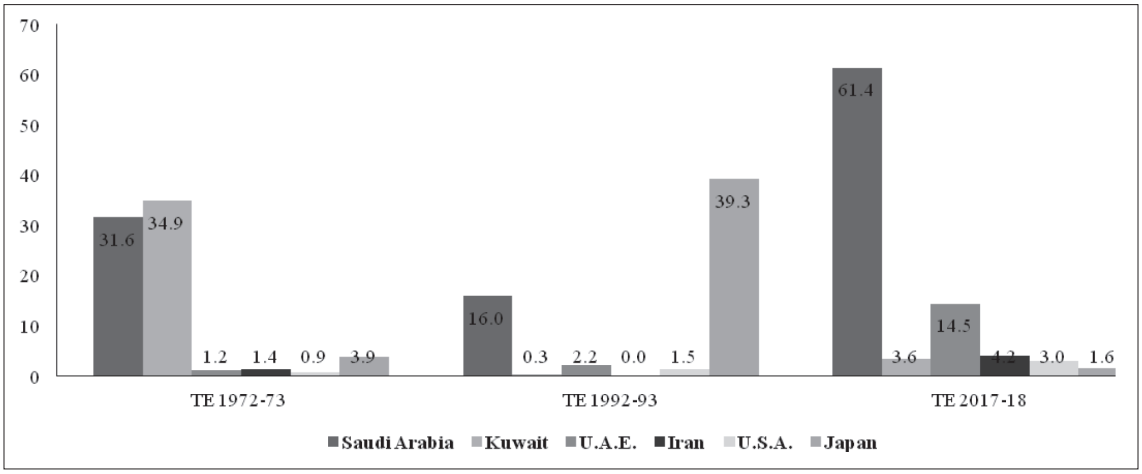

Figure 7. Change in the share of different countries in Indian small cardamom export

Table 6. Geographic concentration of Indian small cardamom export

Year	HI
Pre-WTO	52.62
Post-WTO	63.20
Period I	51.12
Period II	51.34
Period III	57.90
Period IV	62.82
Period V	67.19

observed from Fig. 7 that during TE 1992-93, the major share of small cardamom export from India was to Japan, which reduced tremendously in TE 2017-18. In TE 2017-18, nearly 84 per cent of India's small cardamom export was to Middle-East countries and it was reflected in the higher geographic concentration index.

The study analysed the performance of small cardamom export from India for the period from 1970-71 to 2017-18. It was observed that there was negative growth rate in terms of quantity and value of export during the pre-WTO period, while there was a positive growth rate during the post-WTO period. Maximum growth rate in terms of value and unit value was observed during Period-I, while in terms of quantity exported, maximum growth was during Period-V. The mean export unit value and change in variability of export unit value were found to be the sources of growth and variability in value of small cardamom export from India while it was export quantity that played the major role in bringing about change in the value of export during Period-V. The stability of small cardamom export from India improved in post-WTO period compared to pre-WTO period, while Period-II experienced higher instability in export. Over the period from 1970-71 to 2017-18, the geographic concentration increased gradually, especially during the post-WTO period.

Small cardamom from India has higher demand and fetches higher price in the international market for its superior quality. But the higher cost of production and increasing demand in the domestic market along with the quality control measures related to residual toxic content established by importing countries restricted the export of small cardamom from India. These issues need to be addressed promptly through commodity specific plans and policies. Guidance can be provided to the farmers on minimising the use of toxic plant protection chemicals through Good Agricultural Practices (GAP) that could possibly improve the quality of the commodity so as to meet international standards. The judicious and optimum use of inputs can also reduce the cost of production and increase the country's competitiveness in the international market. This could in turn aid the country to enhance the export

performance of small cardamom and also to regain as well as retain its position in the international market.

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