

# Growth and Instability of Castor Oil Exports from India

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**Abstract:** India is the world's largest producer and exporter of castor seed oil and exports around 80 per cent of its total castor oil production. India has limited domestic consumption with less than 10 per cent production going for a value addition that too is limited to base levels. The main consuming segments are paints (45%), soaps (30%), and lubricants (20%). (Anon., 2020). Though India is a dominant player in the world market, it is just a price taker and not a price setter due to its poor infrastructure. However, it has the capability to improve the exports of the derivatives of castor and overcome this limitation (Gowri Shanker, 2013). Therefore, a study on the growth and stability of castor oil export from India will indicate the expansion or contraction in castor oil export and the degree of risk involved in this business.

**Keywords:** Growth, Instability, Cuddy Della, Castor, Oil seeds.

## 1. Introduction

India is the world's largest producer and exporter of castor seed oil and exports around 80 per cent of its total castor oil production. The main consuming segments are paints (45%), soaps (30%), and lubricants (20%). (Anon., 2020). Castor (*Ricinus communis L.*) originated in the tropical belt of both India and Africa. The world production of castor seed hovers around at an average of 12.5 lakh tons and castor oil is 5.5 lakh tons. The trade of castor oil in the world is estimated at 2.5 lakh tons. India is the world's largest producer and exporter of castor seed oil and exports around 80 per cent of its total castor oil production. The main consuming segments are paints (45%), soaps (30%), and lubricants (20%). (Anon., 2020), even though India is a dominant player in the world market; it is just a price taker due to its poor infrastructure. However, it can improve the exports of the derivatives of castor and overcome this limitation (Gowri Shanker, 2013). Therefore, a study on the growth and stability of castor oil export from India will indicate the expansion or contraction in castor oil export.

India accounts for nearly 60 per cent of the world's castor area and 65 per cent of world castor production and ranks first in both area and production in the world. India produces around 8 lakh tons of castor seed with a 65 per cent share and around 3 lakh tons of castor oil with an approximate 51 per cent share in the world's production. India has a significant place in the international castor oil trade as it produces more than one-third of the total world castor oil. India and Brazil together account for more than 80 per cent of the supply.

**Objective:** To examine growth and instability of castor oil export from India.

## 2. Methodology

Secondary data regarding the exports of castor oil from India (2007-2021) were collected from the website ([www.commodities.com](http://www.commodities.com)). The period of study was 14 years (2007-2021), and data of castor oil export data (country-wise) of India was used. According to the requirements of the above objective of the study and based on the nature and extent of availability of data, compound growth rate analysis and instability index of castor export from India were taken. Compound Growth Rate Growth of any economic variable signifies its past performance. The analysis of growth is usually used in economic studies to find out the trend of a particular variable over some time. It indicates the performance of the variable under consideration and hence it can be very well used for making interpretations and evolving policy decisions. (Devi and Jadav, 2018).

**Exponential Growth Model:**

Compound growth rates were estimated by using log-linear functions on the yearly time series data of the quantity, value and unit value of the exports of the castor. The trend was fitted for the respective study period of the castor. For computing, the compound growth rate, the following form of exponential function was used.

The CAGR was calculated by fitting the exponential function given below:

$$Y = ab^t u_t$$

Where,

Y = Area, production, yield and price of commodity consider in year t

a = intercept

$u_t$  = Error term

b = Regression coefficient

t = Time variable

The equation obtained after transforming (i) is:

$$\text{Log } y = \log a + t \log b + \log u_t$$

The per cent CAGR was calculated as:

$$\text{CAGR} = [(\text{antilog of } b) - 1] \times 100$$

The significant CAGRs will be classified into two groups i.e. negative and positive CAGR. The significance of the growth rate was analyzed by conducting a student's t-test at 1 per cent and 5 per cent levels of significance.

*Instability index:*

The instability index was analyzed by using the Cuddy-Della Valle Index method developed by John Cuddy and Della Valle for measuring the instability in time series data (Cuddy and Della Valle, 1978). This index is adjusted for trend, so is considered a better measure than the Coefficient of Variation. As CV overestimates the level of instability in time-series data, which is characterized by the long-term Cuddy-Della Valle index corrects the coefficient of variation.

Matrix of Association between Growth and Instability Based on analysis of growth rates and instability index the markets under consideration were classward into four categories (Rabadiya, 2019).

$$\text{Instability index} = \frac{\text{Standard Deviation}}{\text{Mean}} \times \sqrt{1 - \bar{R}^2}$$

Where,

C- D II = Instability Index

CV = Coefficient of variation

$\bar{R}^2$  = Coefficient of determination from a time-trend regression adjusted for its degree of freedom.

When the test statistic is significant, then the Cuddy- Della

index is calculated by using the adjusted  $R^2$  value. When a test statistic is not significant or the adjusted  $R^2$  is less than zero, the unmodified CV was chosen (Adhikari & Sekhon, 2014). The high degree of instability index shows that there were huge fluctuations in the time series data during the study period. High growth and low instability are prerequisites for sustainable agricultural performance. Since the magnitude of growth and instability in crops, production has serious implications for policymakers.

**3. Results and Discussion**

Castor oil export from India to various importing nations, china recorded quantity of 3,44,598.09 thousand kgs and a value of 3,12,857 million rupees respectively. The Netherlands recorded 87,562.13 thousand kgs and value of 78,165.60 million followed by that of France and USA with quantities of 71,568.45 and 63,284.78 thousand kgs in terms of quantity of castor oil and values of 63,150.52 million and 59,843 million respectively. Thailand and Japan recorded quantities of 22,212 thousand kgs and 19,420 thousand kgs of castor oil and worth values of 19,420 million and 15,505 million. Korea, U.K., Taiwan imported castor oil worth quantities of 11,327 thousand kgs, 9,637 Kg and 6,152 thousand with values of 11,312 million, 8,803 million and 6,152 million in terms of value. Italy was the least castor oil importing nation with a quantity of 1,413 thousand kgs and a value of 1,391 million rupees respectively.

China and Netherlands recorded significant growth rates of 11.59 per cent and 3.53 per cent at 1% level of significance in terms of export quantity and 18.25 per cent and 9.88 per cent in terms of export value. France recorded significance in growth rate with value of 7.58 per cent at 1% level of significance. USA, Korea recorded significant growth with values of 5.17 per cent, 6 per cent in terms of export quantity and with values of

Table 1  
Destination wise export of castor oil from India during the year 2020-21

Sr. No.	Country	Quantity (Thousand Kg)	Value (Million)	Unit Value (q)	% Share in total export value
1	China	344,598.09	312,857.97	9078.92	55
2	Netherlands	87,562.13	78,165.60	8926.87	13
3	France	71,568.45	63,150.52	8823.79	10
4	USA	63,284.78	59,843.00	9456.14	10
5	Thailand	22,212.34	19,420.55	8743.13	4
6	Japan	16,788	15,505.90	9236.31	3
7	Korea	11,327	11,312.38	9,987.02	2
8	UK	9,637.96	8,803.44	9134.13	1
9	Taiwan	7,161.27	6,152.35	8591.14	1
10	Italy	1,413.70	1,391.22	9840.98	1

Table 2  
Growth and instability of castor export from India from the years 2007– 2021

Country	CAGR (%)		Instability (%)	
	Export quantity	Export value	Export quantity	Export value
China	11.59 **	18.25 **	22.10	25.05
Netherlands	3.53 **	9.88 **	9.79	19.33
France	0.51 NS	7.58 **	21.02	23.97
USA	5.17 **	8.88 **	78.26	20.10
Korea	6.0 **	12.79 **	16.02	14.91
Japan	2.57 NS	7.63 **	21.48	18.90
Thailand	6.89 **	12.91 **	23.79	29.84
UK	5.04 **	10.98 **	8.55	16.69
Taiwan	-2.28 *	2.65 **	10.65	14.39
Italy	18.79 **	23.95**	52.92	44.55

\*\* significant at 1% level \* significant at 5 % level

8.88 per cent and 12.79 per cent respectively in terms of value. Japan showed significant growth at 1 % level of significance with value of 7.63 per cent, UK, Thailand, Italy recorded Significant Growth with values of 6.89 per cent, 5.04 per cent and 18.79 per cent growth rate in terms of quantity and 12.91 per cent, 10.98 per cent and 23.95 per cent growth in terms of export value. Taiwan showed significance in Growth at 5 % level of significance in terms of export quantity and showed significant growth at 1% level of significance in terms of value.

The results of instability values of cuddy Della indicated that China recorded medium instability in terms of export quantify and value. Netherlands recorded low instability in terms of export quantity and medium instability in terms of export value. France recorded medium instability values both in terms of quantity and values. USA recorded high instability value in terms of quantity and medium instability in terms of export value. Korea recorded low instability in terms of export value and medium instability in terms of export quantity. Japan and Thailand recorded medium instability in terms of value and quantity of export. UK And Taiwan recorded low value of instability in terms of export quantity and medium instability was recorded by UK and Taiwan recorded low instability value in terms of value. Italy recorded high instability both in terms of value and quantity and value of exports.

With regard to the matrix relation of growth and instability of castor exports. China recorded low instability in terms of quantity of import and recorded high instability in terms of import value and high growth rates were seen. Countries like Japan, UK, Taiwan and Netherlands recorded low instability and low growth both in terms of value and quantity imported indicating it as the least preferred form. France recorded high instability in value of import and low instability in terms of quantity and low growth rates were recorded. with respect to USA, it recorded high instability in quantity imported and low instability in terms of value of import and low growth rates were recorded. Korea is the only country which recorded low instability and high growth which is the most preferred way in exporting of commodity, Italy recorded values of high instability and high growth rates. with regard to Thailand, it recorded less instability in terms of quantity imported and recorded high instability in terms of the value and high growth.

#### 4. Conclusion

India accounts for nearly 60 per cent of the world's castor area and 65 per cent of world castor production and ranks first in both area and production in the world. India produces around 8 lakh tons of castor seed with a 65 per cent share. China recorded low instability in terms of quantity of import and recorded high instability in terms of import value and high growth rates were seen. Countries like Japan, UK, Taiwan and Netherlands recorded low instability and low growth both in terms of value and quantity imported indicating it as the least preferred form. France recorded high instability in value of import and low instability in terms of quantity and low growth rates were recorded. USA recorded high instability in quantity imported and low instability in terms of value of import and low growth rates were recorded. Korea is the only country which recorded low instability and high growth which is the most preferred way in exporting of commodity, Italy recorded high instability and high growth rate. Thailand, recorded low instability in terms of quantity imported and recorded high instability in terms of the value with high growth.

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