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# Export performance of Onion in India

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**Abstract**
The main purpose of study was to analyze the "Export Performance of Onion in India". The nature of data for study is mainly based on secondary sources. Data of Onion export were collected for the period of 1996-97 to 2018-19. For the purpose of comparison, the period of study was divided into two sub periods, first period (from 1996-97 to 2007-08) and second period (2008-09 to 2018-19). The data collected from department of commerce and industry, Government of India. The present study was undertaken to analyze growth rate and instability in export of Onion. The maximum compound growth rate in onion export to all countries was observed in period-I compared to period-II in all the parameters i.e. quantity, value in rupees and value in US dollar. All the growth rates were statistically significant. The magnitude of CGR of onion export measured in value was highest compared to quantity. This was due to higher prices of onion realized over the years. The CV and CDI of Onion export measured in quantity in period-I was 0.60 and 0.29. It was 0.67 and 0.34 in rupees and 0.65 and 0.37 in dollar respectively. The CV and CDI of Onion export measured in quantity in period-II was 0.27 and 0.23. It was 0.36 and 0.15 in rupees and 0.22 and 0.15 in dollar respectively. The CV and CDI of Onion export measured in quantity in Overall was 0.57 and 0.25. It was 0.79 and 0.24 in rupees and 0.66 and 0.23 in dollar respectively. Thus export of Onion from India in terms quantity, value in rupees and dollar were not steady during the reference period.

**Keywords:** onion, export, instability, cuddy della index

## 1. Introduction

Onion (*Allium cepa*) also known as bulb onion or common onion, is a vegetable crop that belongs to family Amaryllidaceae and the most widely cultivated species of genus Allium. The origin of the onion is central Asia and west Pakistan. Onions were grown in India and China 5000 years ago. It probably acquired its name from the city built by ONIA in 1703 B.C. near gulf of Swez. In India onion has been grown from ancient times as mentioned in a famous early medicine treatise charaka Samhita (6 B.C.).

During 2016-17, World's total area under onion cultivation was 4.96(million Ha), total production 93.17(million tonnes) and productivity was 18.80 (T/Ha). Globally major onion producing countries are China, India, Egypt, USA, Iran, Turky, Russion Fedretion, Pakistan and Brazil. Out of these countries India has the maximum area under onion cultivation i.e. 1.20 million ha and Algeria has the minimum area under cultivation i.e. 0.05 milllon ha. But in production China has the maximum production in the world i.e. 23.91 million tons followed by India and Egypt. In terms of productivity USA has the highest productivity i.e. 56.40 ton/ Ha followed by Egypt and Iran. But the lowest productivity is in Pakistan i.e. 12.80 t/ha. (Source: Horticultural statistics at glance 2018).

In the year 2018-19 India's total area under onion cultivation was 1267 (thousand ha), total production 23284 (thousand MT) and productivity was 18.3(MT/Ha) (source-www.indiaagristat.com). In India major onion producing states are Maharashtra, Karnataka, Madhya Pradesh, Rajasthan, Bihar, Andhra Pradesh etc. Out of these states Maharashtra has maximum area under cultivation i.e. 507.96 (thousand ha) followed by Karnataka, Madhya Pradesh and Rajasthan. But in production Maharashtra has highest production i.e. 8854.09 MT followed by Madhya Pradesh, Karnatka and Bihar. Productivity is highest in Madhya Pradesh i.e. 24.53 t/ha followed by Haryana, Bihar and Andhra Pradesh.

In the year 2018-19 India exported 24, 40,741.9 Thousand MT of onion which has values of Rs 352205.34 Lakhs. India's exports of onion were mainly to neighbouring south east Asian countries and some middle east nations. Malaysia, UAE, Sri Lanka, Bangladesh, Nepal, and Saudi Arabia account for the major share of exports from India. Bangladesh gives highest percent share in total export i.e. 30.50 per cent which gives value of 152.8 US$ million followed by the Malaysia, United Arab Emits, Sri Lanka gives 14.92, 10.75, 10.35 percent

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share in total export, which gives the value of 74.16, 53.49, 51.55 US$ million.

## 2. Methodology
The study area pertains to the country as a whole in general growth rate and instability in export was studied for the country as a whole.

This crop should be selected because of its large area under production and its large export share in worldwide. There is a lot of demand of Indian Onion in the world, the country has exported 2182826.23 MT of fresh onion to the world for the worth of Rs. 3467.06 crore / 497.94 USD Millions during the year 2018-19. Hence this crop was selected to know its performance in export sector and identify the export potential and opportunities.

The secondary data of Onion export were collected for the period of 1996-97 to 2018-19. For the purpose of comparison, the period of study was divided into two sub periods, first period (from 1996-97 to 2007-08) and second period (2008-09 to 2018-19). Data on global exporters and importers were collected from United states Department of Agricultural (USDA). The export data of onion was collected for the HS code 07031010.

The following different analytical tools and techniques were used in the present study Growth rate analysis and Instability index

### 2.1 Growth rate analysis
The compound growth rate was computed based on its fit using non-linear models, especially, the exponential model conventionally, the compound growth rates were estimated after converting the growth model to semi-log form and estimated through Ordinary Least Square (OLS) technique assuming multiplicative error term. However, there are several problems associated with this technique including the difficulty in estimating standard error of estimates of original parameters. Hence, a non-linear estimation technique for solving exponential model assuming additive error terms was used to estimate the compound growth rates.

$$Yt = constant * (1+CGR) + \in t$$

Where,
$Yt$ is the time series data for export for years t
T is the time trends for years of interest,
$\in t$ is the error term and
CGR is compound growth rate for the period under consideration.

The Marquardt algorithm was used to estimate the parameters of equation. The data were smoothened by taking three year moving average to remove bias if any, induced by the outliers. The significance of regression coefficients was tested by applying standard 't' test procedure.

### 2.2 Instability index analysis
Cuddy-Della Valle Instability Index was used to estimate the instability for export data. This index is a modification of coefficient of variation (CV) to accommodate for trend, which is commonly present in time series economic data. It is superior over other scale dependent measures such as Standard Deviation or Root Mean Square of the residuals (RMSE) obtained from the fitted trend lines of the raw data and hence suitable for cross comparisons. The cuddy Della Index (IX) is calculated as follows.

$$Ix = CV\sqrt{(1 - R)^2}$$

Where,
CV = Coefficient of Variation $(\delta/x^-)$
$R^2$ = Adjusted coefficient of multiple determination
Where ever trend in the time series data in non significant, instability of that particular series was analyzed with the help of conventional statistical tool of instability i.e. coefficient of variation. The coefficient of variation (CV) was calculated by using formula,

$$C\ V.\ (per\ cent) = \frac{Standard\ Deviation(a)}{Mean} \times 100$$

## 3 Results and Discussion
Considering the objective of the study, the required data collected was analyzed and interpreted. The results obtained are presented and discussed below.

### 3.1 Growth rate of Onion export
The results obtained by using the expontial growth function used for the estimation of export of Onion are presented in table 1; the result revealed that, the average quantity of onion exported to all countries from India during period-I, period-II and overall period was 641269.78, 1652918.01 and 1125101.54 thousand MT, respectively. The value realized from onion export to all countries in rupees (lakhs) during period-I, period-II and overall period was 50747.10, 258629.04 and 150168.90 lakh, respectively and in US dollar 116.54, 445.29 and 273.77 million, respectively.

**Table 1:** Compound growth rate of Onion export

| Particulars | | Period-I | | | Period-II | | | Overall | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Qty | Rs. | US $ | Qty | Rs. | US $ | Qty | Rs. | US $ |
| Growth | Mean | 641269.78 | 50747.10 | 116.54 | 1652918.01 | 258629.04 | 445.29 | 1125101.54 | 150168.90 | 273.77 |
| | CGR | 20.76 | 23.95 | 23.11 | 4.79 | 8.73 | 4.30 | 7.59 | 11.42 | 8.63 |
| | SE | 2.72 | 3.41 | 3.79 | 1.79 | 1.42 | 1.25 | 1.07 | 1.09 | 1.17 |
| | "t" Value | 7.61 | 7.02 | 6.10 | 2.67 | 6.13 | 3.43 | 7.09 | 10.43 | 7.34 |

The compound growth rate of onion export from India to all countries was 20.76, 4.79 and 7.59 percent per annum during period-I, period-II and overall period, respectively. In value terms, CGR of onion export measured in rupees was 23.95, 8.73 and 11.42 percent per annum; where as in US dollar terms CGR of onion export was 23.11, 4.30 and 8.63 percent per annum, respectively. The maximum compound growth

rate in onion export to all countries was observed in period-I compared to period-II in all the parameters i.e. quantity, value in rupees and value in US dollar. All the growth rates were statistically significant. The magnitude of CGR of onion export measured in value was highest compared to quantity. This was due to higher prices of onion realized over the years.

## 3.2 Instability in export of Onion
The instability in export of onion from India to all countries was estimated with the help of coefficient of variation and Cuddy Della Valla Index and reported in the table 2. The results revealed that, the instability in onion export to all countries was highest during period-I compared to period-II.

**Table 2:** Instability in Onion export

| Particulars | | Period-I | | | Period-II | | | Overall | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Qty | Rs. | US $ | Qty | Rs. | US $ | Qty | Rs. | US $ |
| Instability | CV | 0.60 | 0.67 | 0.65 | 0.27 | 0.36 | 0.22 | 0.57 | 0.79 | 0.66 |
| | CDI | 0.29 | 0.34 | 0.37 | 0.23 | 0.15 | 0.15 | 0.25 | 0.24 | 0.23 |

The result revealed that from table 2, the coefficient of variation in onion export measured in quantity to all countries during period-I, period-II and overall period was 0.60, 0.27 and 0.57, respectively. The coefficient of variation estimates of onion export measured in value (rupees) corresponding to period-I, period-II and overall period was 0.67, 0.36 and 0.79, respectively. The coefficient of variation in regards to value of onion export measured in value (US dollar) for the period-I, period-II and overall period was 0.65, 0.22 and 0.66, respectively.

The Cuddy Della Valla estimates of onion export from India to all countries during the period-I with regards to quantity, value measured in rupees and US dollar was 0.29, 0.34 and 0.37, respectively. During period-II of the study CDI value of onion export measured in quantity value in rupees and value in US dollar was 0.23, 0.15 and 0.15, respectively. At overall study period, CDI value for quantity was 0.25 and for onion export measured in rupees and US dollar value was 0.24 and 0.23, respectively.

## 4. Conclusion
The present study was undertaken to analyze the growth rate and instability in export of onion. The result revealed that, the maximum compound growth rate in onion export to all countries was observed in period-I compared to period-II in all the parameters i.e. quantity, value in rupees and value in US dollar. All the growth rates were statistically significant. The magnitude of CGR of onion export measured in value was highest compared to quantity. This was due to higher prices of onion realized over the years. During study period the onion export in terms of quantity and value shows high level of variability.

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