GROWTH AND INSTABILITY IN PRODUCTION AND EXPORT OF INDIAN ONION
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Abstract
India occupied second position in term of production of onion in the world. The present study entitled “Growth and Instability in Production and Export of Onion in India” was undertaken to know growth and instability in production and export of onion. The nature of data used for the study is entirely based on secondary source of data from 1985-86 to 2014-15. The growth in production and export of onion was measured by Compound Growth Rate, Coefficient of Variation and Coppock’s Instability Index were used for working out the instability in production and export of onion. The growth rate of onion production in India was found to be positive and significant during the period I, period II and overall period of the study. The growth rate for export value and unit value of onion export was found positive and significant for period I, period II and overall period but export quantity found positive but non-significant growth rate in period I of the study. The production of onion exported exhibited less variability with co-efficient of variation at 21.32 per cent and 4.48 per cent in period I and period II, while it was highest in overall period with co-efficient of variation at 68.31 per cent. As regard the export quantity, export value and unit value of onion export shows the highest variation was observed 73.30 per cent, 115.84 per cent and 60.52 per cent of co-efficient of variation in overall period, respectively. Coppock’s Instability Index shows the highest variation in export value of onion i.e. 38.04 per cent in overall period. Instability in onion production was higher in second period. The population, export quantity and unit value of onion increase in period II.

Key Words: Compound Growth Rate, Coefficient of Variation, Coppock’s Instability Index.

Introduction
Onion is one of the important vegetable crops grown in India. In terms of area, India ranks first with an area of 1.17 million hectares (2014-15) and second in production after China, with over 18930 MT (2014-15). Onion consumption has increased in both rural and urban areas. Further, this demand is likely to rise with increase of domestic population, per capita income, increasing consciousness and health awareness of the consumer. Erratic weather and volatile market price is the major factors causing fluctuation in production which result in excess supply or demand. This in turn leads to instability in production. The implication of instability is, on the one hand, price rise upsets consumer and contributes to inflationary pressures on economy and, on the other hand, price fall diminishes the farm income thereby increases the poverty in rural areas. Production and price instability lead to capital rationing and less than optimal resource allocation in agriculture. Instability in agriculture may adversely affect growth in production, investment, employment, consumption and income distribution which may impede the economic development and growth of the country. Maharashtra is reckoned as leading state accounting for more than 30 per cent area. As Maharashtra is major state contributes to the total production (30 per cent) and export (82 – 85 per cent) of India. Presently onion is being exported Bangladesh, Malaysia, Nepal, Singapore, Sri Lanka, United Arab Emirates (UAE), Indonesia, Pakistan, Oman, Dubai, Qatar and Kuwait. The Netherlands is leading exporter of onion contributing to about 21 per cent of world export. The objective of study was to estimate growth in production and export of onion and to work out the instability in production and export of onion.

Materials and Methods
The current study made use of secondary time series data on production and export of onion from 1985-86 to 2014-15, which includes 30 years data, that was collected from the Food and Agriculture Organization (2015) and Agricultural and Processed Food Products Export Development Authority (2015). The entire study period was divided into two sub periods i.e. period I (1985-86 to 1999-00), period II (2000-01 to 2014-15) and overall period(1985-86 to 2014-15). Data on export quantities, export value, major destination of exports and export prices at domestic and international markets were collected for onion. To fulfil the objectives of the study the Compound Growth Rate (CGR), Coefficient of Variation (CV), Coppock’s Instability Index (CII) were used to assess the data.

1. Analysis of Growth Rates
The growth rates were used to measure the past performance of the economic variables. The growth in production, quantity exported, export value and unit value realised from export was estimated by using following formula.

\[ Y = a \cdot b^t \]

Where,
\[ Y = \text{production /export quantity / export value / unit value of onion export} \]
\[ a = \text{constant term} \]
\[ b = \text{regression coefficient} \]
\[ t = \text{time variable} \]

The compound growth rates ‘r’ was computed by using the following formula.

\[ \text{CGR (r)} = [ \text{Antilog (log } b \text{-1) * 100} \]

Where,
\[ Y = \text{production and export} \]
\[ t = \text{time period (t = 1, 2, 3,…)} \]
\[ b = \text{regression coefficient} \]
\[ a = \text{constant term} \]
\[ r = \text{Compound Growth Rate} \]

(a) Instability Analysis
Instability in export is expected to hamper the process of economic development. To study the degree of instability in production and export of onion was measured by using coefficient of variation

\[ \text{Coefficient of variation (CV)} = \frac{\sigma}{\overline{X}} \times 100 \]

Where,
\[ \sigma = \text{Standard deviation} \]
\[ \overline{X} = \text{Arithmetic mean} \]
\[ X = \text{Variable} \]
\[ n = \text{Number of observations} \]

(b) Coppock’s Instability Index (CII)
Coefficient of instability is another measure of instability besides coefficient of variation. The coefficient of variation measures the variation around the trend. Coppock’s Instability Index (CII) is close approximation of the average year to year percentage adjusted for the trend are rose pronounced than the absolute variation.

Coefficient of instability was worked out using Coppock’s Instability Index.

\[ V \log = \frac{\sum (\log \frac{X_{t+1}}{X_t} - m)}{N} \]

The Instability Index = [Antilog (√V log)-1] x 100

Where,

\[ X_t = \text{Production/Export Quantity/Export value} \]

Table 1 : Compound Growth Rate of Production, Export Quantity, Export Value and Unit Value of Onion Export (1985-86 to 2014-15)

<table>
<thead>
<tr>
<th>Particulars</th>
<th>CGR</th>
<th>R²</th>
<th>SE</th>
<th>t-Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Production</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Period I</td>
<td>4.38**</td>
<td>0.84</td>
<td>0.002</td>
<td>8.16</td>
</tr>
<tr>
<td>Period II</td>
<td>12.65**</td>
<td>0.96</td>
<td>0.003</td>
<td>16.89</td>
</tr>
<tr>
<td>Overall Period</td>
<td>7.27**</td>
<td>0.90</td>
<td>0.002</td>
<td>16.19</td>
</tr>
<tr>
<td>Export Quantity</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Period I</td>
<td>3.87</td>
<td>0.23</td>
<td>0.008</td>
<td>1.95</td>
</tr>
<tr>
<td>Period II</td>
<td>9.47**</td>
<td>0.69</td>
<td>0.007</td>
<td>5.39</td>
</tr>
<tr>
<td>Overall Period</td>
<td>8.31**</td>
<td>0.83</td>
<td>0.003</td>
<td>11.60</td>
</tr>
<tr>
<td>Export Value</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Period I</td>
<td>15.17**</td>
<td>0.81</td>
<td>0.008</td>
<td>7.33</td>
</tr>
<tr>
<td>Period II</td>
<td>17.95**</td>
<td>0.90</td>
<td>0.007</td>
<td>10.80</td>
</tr>
<tr>
<td>Overall Period</td>
<td>15.99**</td>
<td>0.96</td>
<td>0.003</td>
<td>24.55</td>
</tr>
<tr>
<td>Unit Value of Export</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Period I</td>
<td>10.88**</td>
<td>0.87</td>
<td>0.005</td>
<td>9.35</td>
</tr>
<tr>
<td>Period II</td>
<td>7.74**</td>
<td>0.81</td>
<td>0.004</td>
<td>7.41</td>
</tr>
<tr>
<td>Overall Period</td>
<td>7.10**</td>
<td>0.90</td>
<td>0.002</td>
<td>15.47</td>
</tr>
</tbody>
</table>

The data presented in Table 1 revealed that, the growth rate of onion production in India was found higher in period II (12.65 %) than period I (4.38 %) and at overall level the growth in production was observed 7.27 per cent. The growth rate of onion production in India was found to be positive and significant during the period I, II and overall period of study. In period I the export quantity being exported showing positive but non-significant growth rate of 3.87 per cent per annum while production, export value and unit value realized through exports have growth rate 4.38 per cent per annum, 15.17 per cent per annum and 10.88 per cent per annum, respectively and were found to be statistically significant at one per cent level of significance. However, during period II production, export quantity, export value and unit value of export going significantly at the rate of 12.65 per cent per annum, 9.47 per cent per annum, 17.95 per cent per annum and 7.74 per cent per annum, respectively.

The overall 30 years growth rate of export value of onion in India was highly significant at 15.99 per cent per annum and much higher than the growth rate of production, export quantity and unit value of export of onion for overall period was 7.27, 8.31 and 7.10 per cent per annum, respectively and significant at one per cent level. Hence, the hypothesis i.e. there is significant stable growth in production and export of onion in India is accepted here. The results obtained are in close agreement with the findings of Jyothi et al. (2003) they concluded that, the export earnings and unit value of exports were found to be stable as compared to the export quantity. Malik et al. (2003) concluded that, the production of onion in the overall period increased significantly.

2. Analysis of Instability in Onion Exports

a) Coefficient of Variation (CV)

In order to study the variability in production, export quantity, export value and unit value of onion exports during 1985-86 to 2014-15 the co-efficient of variation for the production of onion exported exhibited less variability with co-efficient of variation at 21.32 and 4.48 per cent in period I and period II, while it was highest in overall period with co-efficient of variation at 68.31 per cent. As regard the quantity of onion the highest variation was observed 73.30 in overall period with co-efficient of variation at 31.02 in period I and 39.26 per cent in period II. Export earnings in terms of value showed higher instability in overall period with 115.84 per cent of co-efficient of variation when compared to the period I and period II. However, the instability observed in unit value of onion export was observed highest variation in overall period with coefficient variation at 60.52 and 44.49 per cent in period I and 39.80 per cent in period II.

Table 2(a): Instability of Production, Export Quantity, Export Value and Unit Value of Onion Export in India (1985-86 to 2014-15)

<table>
<thead>
<tr>
<th>Period</th>
<th>Particulars</th>
<th>Production</th>
<th>Export Quantity</th>
<th>Export Value</th>
<th>Unit Value of Export</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean</td>
<td>3.66</td>
<td>298330.98</td>
<td>14230.11</td>
<td>4.61</td>
</tr>
<tr>
<td></td>
<td>SD</td>
<td>0.78</td>
<td>92528.72</td>
<td>7692.71</td>
<td>2.05</td>
</tr>
<tr>
<td></td>
<td>CV (%)</td>
<td>21.32</td>
<td>31.02</td>
<td>54.06</td>
<td>44.49</td>
</tr>
<tr>
<td>Period II</td>
<td>Mean</td>
<td>11.10</td>
<td>1111068.48</td>
<td>135490.06</td>
<td>11.22</td>
</tr>
</tbody>
</table>
From the above it is clear that, instability in production and unit value of export in onion was less during period II. Findings can be correlated with Vedamurthy and Pandey (2010).

b) Coppock’s Instability Index (CII)

It could be revealed from Table 2(b) that, the highest variation observed in export value of onion was 38.04 per cent in overall period and 20.22 and 21.78 per cent in period I and period II, respectively. Coppock’s Instability Index for production, export quantity and unit value of export is in period I 12.33, 14.29 and 0.21 per cent, respectively.

In period II it was observed in production, export quantity, and unit value of export was 17.24, 16.28 and 14.49 per cent and for overall period it was 19.15, 21.64 and 18.93 per cent, respectively. The discussion thus revealed that, instability in onion production, export quantity and export value was higher in period II.

Table 2(b) : Coppock’s Instability Index of Production, Export Quantity, Export Value and Unit Value of exports of onion in India (1985-86 to 2014-15)

<table>
<thead>
<tr>
<th>Sr. No.</th>
<th>Particulars</th>
<th>Production</th>
<th>Export Quantity</th>
<th>Export Value</th>
<th>Unit Value of Export</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Period I</td>
<td>12.33</td>
<td>14.29</td>
<td>20.22</td>
<td>0.21</td>
</tr>
<tr>
<td>2</td>
<td>Period II</td>
<td>17.24</td>
<td>16.28</td>
<td>21.78</td>
<td>14.49</td>
</tr>
<tr>
<td>3</td>
<td>Overall Period</td>
<td>19.15</td>
<td>21.64</td>
<td>38.04</td>
<td>18.93</td>
</tr>
</tbody>
</table>

Conclusions

There is increase in agriculture exports but percentage share of agriculture export to total exports was decreasing due to increase in share of manufacturing sectors, service sectors etc. There is increase in quantity of India’s onion export during period I and percentage share of worlds onion export to India’s onion export was also increasing in whole period of study.

The growth rate of onion production in India was found to be positive and significant during the period I, period II and overall period of the study.

The growth rate for export value and unit value of onion export was found positive and significant for period I, period II and overall period but export quantity found positive but non-significant growth rate in period I of the study.

The production of onion exported exhibited less variability with coefficient of variation at 21.32 and 4.48 per cent in period I and period II, while it was highest in overall period with coefficient of variation at 68.31 per cent.

As regard the export quantity, export value and unit value of onion export shows the highest variation was observed 73.30, 115.84 and 60.52 per cent of co-efficient of variation in overall period, respectively.

Coppock’s Instability Index shows the highest variation in export value of onion i. e. 38.04 per cent in overall period. Instability in onion production was higher in second period. The population, export quantity and unit value of onion increase in period II.

Policy Implications

The production level has to be improved so as to increase the availability as well as to reduce the per unit cost of production. This can be achieved by improved Research and Development in evolving suitable varieties.

The instability in the price factor can be minimized by resorting to measures like futures trading and making readily available International market information.

The increase in production of onion has been attributed to the rising exports in the recent decade. However, the spurt in export should not lead to price rise. Hence, an appropriate export policy along with policy on fixing Minimum Export Price during glut season should be in place. This will bring a balance in the price discovery of onion.

References


