

## Global Fruits Foreign Trade Research during WTO Regime: World Trading Signals & Policies

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### Abstract:

Fruits play an important role in human diet and to maintain better health. Globally, India ranks second in fruits production after China. Grapes, mangoes, bananas and oranges were the selected fruit crops for study purpose. The study period is from 1990 to 2018. The present study analyzed the growth rates, instability and elasticity of export quantity, prices of selected fruit crops from major producing countries in the world and also dealt with the major export destinations of Indian fruits. The results showed that an exporting countries should export grapes to Peru, Spain and Chile; bananas to the Panama, Philippines and Ecuador; mangoes to Italy, Egypt and Australia; and, oranges to Thailand, Philippines and Mexico for generating higher revenue because in global market those countries were associated with highest export price with the stability. Globally, the export price elasticity was inelastic in all countries of grapes, oranges and bananas except Italy in oranges and panama in bananas. The study found that export price elasticity of mangoes was marginally higher in the Spain and the Netherlands. The study showed that the major destinations for Indian fruits are; USA, Germany and Netherlands for grapes; USA, Belgium and Germany for bananas; USA, the Netherlands and Viet Nam for mangoes; and, Germany, France and Netherlands for oranges. Globally, the current study gave useful data to comprehend competition of prices for fruits to importing countries. This study may assist in preparing major price strategies and policies on fruits and also assisted in foreign earnings for all nations.

Key words: World Trading signals, Fruits, WTO, Foreign Trade Research, Policies

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## 1. INTRODUCTION:

Fruits play an important role in human healthy and strongest diet as they give the essential vitamins, minerals, phyto-chemicals and fiber required for maintaining human health. Most of the people required to double the amount of fruits and vegetables as they eat every day. Several studies have shown that adequate intake of fruits helps to prevent several diseases such as cancer, cataract formation and heart disease and stroke. Fruits consumption can protect from oesophageal, pancreatic, stomach, bladder and cervical cancers (Oguntibeju et al, 2013). Globally, China ranks first in fruits production followed by India. China alone produces some 275 Mt of fruit annually (Statistica, 2020). Highest per capita of fresh fruit has seen in Americans, who consumed 115.14 pounds in 2018.

In India, Fruits and vegetables accounted for approximately 90% of the total horticulture production (Birthare & Sugam, 2018). In India, 90.2 Mt of production and 6.3 M ha of area under cultivation of fruits were observed during 2015-16 (National Horticultural Board). Among the fruits, India ranks first in production of bananas (25.7%) followed by papayas (43.6%) and mangoes (including mangosteens and guavas) (40.4%).

The huge production of fruits provided India with many alternatives for export. India exported mostly grapes, pomegranates, mangoes, bananas and oranges to other countries. According to APEDA, the major destinations were Bangladesh, UAE, Netherland, Nepal, Malaysia, UK, Sri Lanka, Oman and Qatar for Indian fruits. India exported fruits valued Rs. 10236.93 crores or \$1,469.33 M that comprised of fruits valued Rs. 4817.35 crores or \$ 692.01 M during 2018-19 (APEDA). India has exported 246133.79 Mt of Grapes to the world valued Rs.2335.24 crores or \$ 334.79 M during the year 2018-19. During the same year, India has exported 46510.27 Mt of fresh mangoes to the world valued Rs. 406.45 crores or \$ 60.26 M. During 2018-19 season, India closed its grape export to Europe, which is the most premium market with a 31 per cent rise in fruit exports. Exports to China, Russia and other destinations are expected to have increased by about 25-30%. According to APEDA, Grapes from India exports increased from 92,286 T (2017-18) to 1,21,469 T (2018-19). The Netherlands, Germany and UK accounted for 90% of India's grape. Bangladesh government levied heavy import duty on Indian orange exporters. The export market of oranges is sinking year by year in absence of any agreement on

the sale and purchases of orange from India (Agri Exchange). During this year, India is likely to identify new markets as Singapore and Gulf countries for oranges (APEDA).

Economic accuracy of fruit crops is of highly importance. This leads to the study on the international trade of fruit crops in major producing countries of the world. Hence, the research analyzed the CAGR, instability and elasticity of export quantity, prices of grapes, bananas, mangoes and oranges of major producing countries in the world. The research also analyzed the export destinations of selected fruit crops.

## 2. Methodology:

Data has been collected on the exports quantity, value and price of fruit crops and its destinations in the overseas market were collected from the Food and Agricultural Organization Statistics (FAOSTAT), Directorate General of Commercial Intelligence and Statistics (DGCIS), Agricultural Produce Export Development Authority (APEDA), Centre for Monitoring on Indian Economy (CMIE) and Horticultural Statistics at a glance 2018. Grapes, mangoes, banana and oranges were selected for the study purpose because of major export fruit crops in the globe. CAGR, price elasticity and instability index were employed for study. The study analyzed the CAGR, price elasticity, and instability index of the export quantities and prices of individual selected fruit crops in major producing countries of the world. India's exported Top 10 Individual country wise analysis of fruit crops among 150 nations was also completed. India exported these fruit crops to the countries, which were classified to identify the major share of Indian export destinations of each commodity as top 10 countries.

CAGR, instability index and price elasticity exports were computed with the help of the following formulae.

### Growth rate:

During the period from 1990–1991 to 2017-18, CAGR was computed by fitting an exponential function to the parameters.

$$Y_t = Y_0(1+r)^t \dots\dots\dots(1)$$

Assuming a multiplicative error term in equation (1), the model may be linearized by logarithmic transformation:

$$\ln Y_t = A + Bt + \epsilon \dots\dots\dots (2)$$

Where A (=lnA<sub>0</sub>) and B (=ln(1 + r)) are the parameters to be projected by OLS regression, t = time trend in year, and r = exp (B)-1.

### Price elasticity of exports:

$$\sum P_e = \% \text{ change in quantity exports} / \% \text{ change in price.}$$

The percentage change in quantity of exports is %ΔQ, and the percentage change in price is %ΔP. We computed %ΔQ as ΔQ/Qave and calculate %ΔP as ΔP/Pave, so the price elasticity of exports is expressed as (ΔQ/Qave)/(ΔP/Pave).

### Instability index:

$$\text{Coefficient of variation (CV)} = \frac{\text{Standard deviation}}{\text{Mean}} \times 100$$

## 3. Results and Discussions:

### 3.1. Growth Rate and Instability of Fruit Crops Export Quantity and Prices:

#### 3.1.1. Growth Rate and Instability of Grapes Exports Quantity and Price for Major Producing Countries in the World:

During 1990-91 to 2017-18, growth rates and instability of exports quantity and price of grapes for the major producing countries in the world have presented in the Table 1. China (21.82%) exported more export quantity followed by Hong Kong (19.46%) and Peru (19.32%) during the period of 1990-91 to 2017-18. Peru (5.49%) exported grapes with higher price followed by the Spain (3.30%) and Chile (3.19%) during the same period.

Export quantity of grapes was found to be stable in all countries except China (105.82) and Peru (148.76) during the study period. However, export price of grapes in Chile, USA, Netherlands, Italy, China, Peru, South Africa, Hong Kong, Spain and Australia were found to be stable.

An exporting country should transport grapes to Peru, Spain and Chile for generating more income as it is association of highest export price with the stability in the overseas market. Export

quantity and prices of grapes was found to be stable in all countries except in export quantity of China and Peru during the study period.

**Table 1: Decadal Wise Exports Quantity and Price Growth Rate and Instability of Grapes for Major Producing Countries in the World** (Quantity in 'tonnes & Price in 'US\$/Ton)

| Countries    | 1990-91 to 2000-01 |                  | 2001-02 to 2011-12 |                 | 2012-13 to 2017-18 |                  | 1990-91 to 2017-18 |                 |
|--------------|--------------------|------------------|--------------------|-----------------|--------------------|------------------|--------------------|-----------------|
|              | Export Quantity    | Export Price     | Export Quantity    | Export Price    | Export Quantity    | Export Price     | Export Quantity    | Export Price    |
| Chile        | 3.68<br>(15.36)    | 0.33<br>(4.23)   | 3.07<br>(10.99)    | 8.95<br>(30.88) | -2.83<br>(8.07)    | -0.47<br>(6.46)  | 1.50<br>(23.21)    | 3.19<br>(41.59) |
| USA          | 3.12<br>(12.24)    | 1.78<br>(7.10)   | 1.87<br>(11.06)    | 4.72<br>(17.27) | -1.84<br>(8.72)    | 0.33<br>(1.31)   | 1.54<br>(21.44)    | 2.84<br>(26.42) |
| Netherlands  | 7.84<br>(27.31)    | -2.59<br>(8.92)  | 14.59<br>(39.44)   | 4.94<br>(19.34) | 6.06<br>(14.14)    | -1.72<br>(7.84)  | 8.31<br>(62.00)    | 1.17<br>(23.38) |
| Italy        | 4.26<br>(14.56)    | -4.08<br>(15.93) | -2.88<br>(14.44)   | 7.31<br>(24.73) | 0.43<br>(4.72)     | 1.81<br>(4.71)   | 0.74<br>(14.09)    | 1.46<br>(30.39) |
| China        | 36.81<br>(83.15)   | -5.17<br>(26.31) | 15.24<br>(48.54)   | 3.76<br>(31.55) | 15.07<br>(32.18)   | 0.78<br>(11.69)  | 21.82<br>(105.82)  | 1.16<br>(40.04) |
| Peru         | 2.70<br>(84.21)    | 13.34<br>(71.47) | 33.79<br>(93.04)   | 3.49<br>(13.37) | 12.64<br>(26.52)   | -0.28<br>(5.01)  | 19.32<br>(148.76)  | 5.49<br>(44.03) |
| South Africa | 13.15<br>(40.96)   | -2.36<br>(12.99) | 3.25<br>(14.60)    | 8.91<br>(29.94) | 5.01<br>(12.30)    | -0.35<br>(5.34)  | 7.01<br>(43.99)    | 1.41<br>(26.11) |
| Hong Kong    | 41.31<br>(86.63)   | -5.08<br>(24.23) | 7.87<br>(30.55)    | 5.18<br>(32.80) | 11.51<br>(22.94)   | -4.14<br>(10.42) | 19.46<br>(81.59)   | 0.33<br>(29.71) |
| Spain        | 1.61<br>(13.36)    | -0.81<br>(11.07) | 3.85<br>(12.69)    | 9.97<br>(29.71) | 3.01<br>(6.58)     | 1.10<br>(4.77)   | 1.83<br>(17.76)    | 3.30<br>(37.77) |
| Australia    | 12.35<br>(46.02)   | -1.68<br>(14.41) | -0.47<br>(28.88)   | 8.55<br>(27.03) | 21.20<br>(30.96)   | 1.02<br>(10.46)  | 9.05<br>(67.58)    | 2.07<br>(24.65) |
| India        | 14.46<br>(36.70)   | 0.00<br>(10.95)  | 17.86<br>(58.98)   | 1.20<br>(12.21) | 10.13<br>(27.39)   | 5.34<br>(13.10)  | 14.03<br>(86.96)   | 1.91<br>(31.33) |

|                        |                 |                  |                 |                 |                 |                  |                 |                 |
|------------------------|-----------------|------------------|-----------------|-----------------|-----------------|------------------|-----------------|-----------------|
| <b>Other Countries</b> | 8.42<br>(26.81) | -0.85<br>(10.36) | 1.20<br>(12.21) | 4.57<br>(15.50) | 4.29<br>(13.97) | -2.57<br>(10.50) | 6.00<br>(43.36) | 0.67<br>(15.74) |
|------------------------|-----------------|------------------|-----------------|-----------------|-----------------|------------------|-----------------|-----------------|

Source: FAOSTAT, DGCIS & CMIE, Note: Figure in parenthesis indicates the CV (%)

### 3.1.2. Growth Rate and Instability of Bananas Exports Quantity and Price for Major Producing Countries in the World:

Decadal wise growth rate and instability of exports quantity and price of bananas during 1990-91 to 2017-18 has presented in the Table 2 for the major producing countries in the world. There was negative growth rate of bananas export quantity observed in the Panama (-3.51%) during the period of 1990-91 to 2017-18. The Netherlands (10.75%) was shown the maximum growth rate of bananas export quantity followed by Germany (9.63%) and Guatemala (7.19%). However, the export price of bananas had higher growth rate in Panama (4.32%) followed by the Philippines (2.98%) and Ecuador (2.90%). The export quantity of bananas was stable in all countries except Netherlands (108.92). All countries bananas export price was found to be stable.

The results revealed that Netherlands, Germany and Guatemala exported more quantity of bananas. Export price of bananas was higher in Panama, Philippines and Ecuador. An exporting country would be benefitted when it exports the bananas to the Panama, Philippines and Ecuador due to stability of prices associated with highest growth rate of prices. Stability in the banana prices were observed in all countries across the world.

**Table 2: Decadal Wise Exports Quantity and Price Growth Rates of Bananas for Major Producing Countries in the World** (Quantity in 'tonnes & Price in 'US\$/Ton)

| Countries   | 1990-91 to 2000-01 |                  | 2001-02 to 2011-12 |                 | 2012-13 to 2017-18 |                 | 1990-91 to 2017-18 |                 |
|-------------|--------------------|------------------|--------------------|-----------------|--------------------|-----------------|--------------------|-----------------|
|             | Export Quantity    | Export Price     | Export Quantity    | Export Price    | Export Quantity    | Export Price    | Export Quantity    | Export Price    |
| Ecuador     | 6.36<br>(22.58)    | -0.52<br>(11.74) | 3.77<br>(11.53)    | 6.47<br>(28.85) | 4.36<br>(7.97)     | 2.94<br>(4.96)  | 4.12<br>(25.86)    | 2.90<br>(30.19) |
| Costa Rica  | 3.78<br>(14.07)    | 1.75<br>(10.63)  | -0.23<br>(8.32)    | 3.93<br>(14.87) | 6.05<br>(12.16)    | 3.28<br>(5.38)  | 2.12<br>(11.94)    | 2.58<br>(19.33) |
| Philippines | 6.66<br>(19.39)    | 0.25<br>(2.84)   | -0.39<br>(12.36)   | 5.12<br>(12.00) | 0.16<br>(36.46)    | 9.93<br>(20.16) | 4.37<br>(38.19)    | 2.98<br>(34.46) |

|                    |                  |                  |                  |                 |                  |                  |                   |                 |
|--------------------|------------------|------------------|------------------|-----------------|------------------|------------------|-------------------|-----------------|
| Belgium            | -<br>(0.00)      | -<br>(0.00)      | 2.73<br>(15.80)  | 4.21<br>(16.30) | 0.86<br>(5.78)   | -4.63<br>(12.21) | -<br>(13.89)      | -<br>(16.39)    |
| Colombia           | 3.14<br>(10.76)  | 0.08<br>(6.23)   | 3.12<br>(10.12)  | 4.49<br>(19.46) | 1.69<br>(7.84)   | 0.39<br>(2.21)   | 1.85<br>(10.91)   | 1.85<br>(22.18) |
| Guatemala          | 8.34<br>(29.33)  | 0.77<br>(9.58)   | 5.25<br>(19.23)  | 3.71<br>(13.89) | 4.66<br>(8.49)   | 1.59<br>(3.98)   | 7.19<br>(53.83)   | 2.10<br>(19.07) |
| Netherlands        | 1.32<br>(41.48)  | -1.31<br>(14.82) | 11.28<br>(58.84) | 3.25<br>(17.69) | 25.78<br>(40.97) | -0.65<br>(3.92)  | 10.75<br>(108.92) | 0.28<br>(16.99) |
| USA                | 1.72<br>(6.81)   | -1.67<br>(11.04) | 2.40<br>(34.84)  | 7.84<br>(28.35) | 2.87<br>(4.74)   | -2.57<br>(5.96)  | 2.12<br>(25.69)   | 1.63<br>(27.20) |
| Germany            | 13.89<br>(58.82) | -0.70<br>(14.04) | 9.92<br>(35.68)  | 3.34<br>(14.50) | 4.42<br>(11.28)  | -1.70<br>(6.19)  | 9.63<br>(68.58)   | 0.50<br>(15.97) |
| Panama             | -4.12<br>(14.73) | 0.60<br>(3.99)   | -4.69<br>(18.90) | 1.34<br>(9.25)  | 2.82<br>(5.67)   | 20.76<br>(38.80) | -3.51<br>(39.41)  | 4.32<br>(45.27) |
| Other<br>Countries | 1.67<br>(21.48)  | -1.07<br>(13.64) | 3.11<br>(11.60)  | 3.71<br>(17.64) | 4.71<br>(10.29)  | 0.84<br>(6.36)   | 2.87<br>(20.86)   | 0.58<br>(14.67) |

Source: FAOSTAT, DGCIS, & CMIE, Note: Figure in parenthesis indicates the CV (%)

### 3.1.3. Growth Rate and Instability of Mangoes Exports Quantity and Price for Major Producing Countries in the World:

Decadal Wise growth rate and instability of mangoes exports quantity and price during the period from 1990-91 to 2017-18 have depicted in Table 3 for the major producing countries. There was negative growth rate of mangoes observed in the export price of Spain (-2.13%) and the Netherlands (-0.43%) during the study period. Export quantity of mangoes in Spain (40.85%) had higher growth rate followed by Peru (16.78%) and the Netherlands (15.67%). The export price growth rate of mangoes was more in Thailand (5.65%), Philippines (3.94%) and Mexico (3.03%).

During the study period, the variation of export quantity of mangoes was greater in the Viet Nam (470.32), Ghana (202.64), Egypt (166.82), Thailand (125.87) and Spain (123.37). Similarly, the export price of mangoes in all countries was stable except Ghana, where the variation of export price was Ghana (108.36).

The results showed that Spain has exported more mangoes followed by Peru and Netherlands. Mangoes export prices were higher in Thailand, Philippines and Mexico. An exporting country should be profited if mangoes exported to Thailand, Philippines and Mexico because these countries were coupled with higher growth rate with stability of prices in an international market.

**Table 3: Decadal Wise Exports Quantity and Price Growth Rate and Instability of Mangoes for Major Producing Countries in the World** (Quantity in ‘tonnes & Price in ‘US\$/Ton)

| Countries   | 1990-91 to 2000-01 |                   | 2001-02 to 2011-12 |                   | 2012-13 to 2017-18 |                  | 1990-91 to 2017-18 |                  |
|-------------|--------------------|-------------------|--------------------|-------------------|--------------------|------------------|--------------------|------------------|
|             | Export Quantity    | Export Price      | Export Quantity    | Export Price      | Export Quantity    | Export Price     | Export Quantity    | Export Price     |
| Mexico      | 13.41<br>(37.74)   | 1.44<br>(24.91)   | 3.99<br>(13.62)    | 1.24<br>(15.56)   | 7.95<br>(15.62)    | 4.08<br>(7.73)   | 7.70<br>(40.22)    | 3.03<br>(29.14)  |
| Netherlands | 25.24<br>(64.80)   | -7.34<br>(22.73)  | 9.98<br>(35.03)    | 5.78<br>(18.59)   | 12.99<br>(23.74)   | 2.29<br>(5.29)   | 15.67<br>(76.30)   | -0.43<br>(24.46) |
| Viet Nam    | -<br>(171.93)      | -<br>(39.46)      | 3.45<br>(73.97)    | -0.98<br>(24.13)  | 186.68<br>(227.87) | 8.99<br>(31.41)  | -<br>(470.32)      | -<br>(35.81)     |
| Thailand    | 4.34<br>(47.55)    | 6.32<br>(26.29)   | 30.26<br>(104.92)  | 3.42<br>(96.35)   | 4.47<br>(12.97)    | 11.55<br>(20.17) | 14.92<br>(125.87)  | 5.65<br>(76.14)  |
| Brazil      | 30.66<br>(81.67)   | -1.51<br>(40.33)  | 2.99<br>(11.05)    | 7.55<br>(27.29)   | 7.17<br>(15.07)    | 1.05<br>(4.48)   | 14.51<br>(63.08)   | 2.29<br>(33.79)  |
| Peru        | 23.90<br>(67.02)   | 2.15<br>(9.98)    | 16.65<br>(41.97)   | -0.83<br>(15.06)  | 10.30<br>(17.66)   | -0.42<br>(11.66) | 16.78<br>(87.48)   | 1.02<br>(18.70)  |
| India       | 7.32<br>(31.53)    | -7.34<br>(25.04)  | 17.36<br>(43.16)   | 7.85<br>(25.73)   | -4.28<br>(16.58)   | 6.32<br>(14.47)  | 8.43<br>(75.18)    | 0.59<br>(30.32)  |
| Spain       | 102.38<br>(122.39) | -11.44<br>(47.90) | 19.10<br>(60.48)   | 5.44<br>(19.33)   | 10.39<br>(25.63)   | 3.79<br>(9.87)   | 40.85<br>(123.37)  | -2.13<br>(33.35) |
| Philippines | 11.93<br>(33.12)   | -1.71<br>(9.58)   | -2.29<br>(20.82)   | 12.91<br>(48.22)  | 0.46<br>(22.96)    | 2.63<br>(10.72)  | 2.41<br>(29.40)    | 3.94<br>(62.18)  |
| Ghana       | -<br>(77.47)       | -<br>(26.65)      | 9.89<br>(72.30)    | 31.81<br>(116.65) | 62.47<br>(103.72)  | 24.52<br>(49.57) | -<br>(202.64)      | -<br>(108.36)    |

|                    |                   |                  |                     |                 |                 |                 |                   |                 |
|--------------------|-------------------|------------------|---------------------|-----------------|-----------------|-----------------|-------------------|-----------------|
| Egypt              | 10.89<br>(101.94) | -8.79<br>(45.54) | -100.00<br>(167.28) | -<br>(61.22)    | 7.22<br>(52.79) | 6.49<br>(22.23) | 16.24<br>(166.82) | 2.63<br>(57.16) |
| Other<br>Countries | 13.08<br>(40.20)  | -<br>(35.09)     | 9.31<br>(27.50)     | 4.66<br>(19.49) | -1.04<br>(7.03) | 6.70<br>(12.69) | 8.06<br>(57.57)   | -<br>(31.90)    |

Source: FAOSTAT, DGCIS & CMIE; Note: Figure in parenthesis indicates the CV (%)

### 3.1.4. Growth Rate and Instability of Oranges Exports Quantity and Price for Major Producing Countries in the World:

Decadal growth rate and instability of oranges exports quantity and price from 1990-91 to 2017-18 have presented in the Table 4 for the major producing countries. Oranges exported more quantity to Hong Kong (12.20%) followed by Egypt (6.25%) and Turkey (6.06%). Oranges exported to Italy (3.07%) with higher price followed by Egypt (2.91%) and Australia (2.79%).

The variation in the export quantity and prices of oranges were stable in all the countries across the world.

The results showed that Hong Kong exported more quantities of oranges followed by Egypt and Turkey. But, oranges exported with higher price in Italy, Egypt and Australia. Due to higher demand, the export prices of Italy, Egypt and Australia were higher. So, an exporting country should be profited if oranges exported to Italy, Egypt and Australia. Because those countries export prices of oranges were associated with stability of prices in the overseas market.

**Table 4: Decadal Wise Exports Quantity and Price Growth Rate and Instability of Oranges for Major Producing Countries in the World** (Quantity in 'tonnes & Price in 'US\$/Ton)

| Countries    | 1990-91 to 2000-01 |                  | 2001-02 to 2011-12 |                  | 2012-13 to 2017-18 |                 | 1990-91 to 2017-18 |                 |
|--------------|--------------------|------------------|--------------------|------------------|--------------------|-----------------|--------------------|-----------------|
|              | Export<br>Quantity | Export<br>Price  | Export<br>Quantity | Export<br>Price  | Export<br>Quantity | Export<br>Price | Export<br>Quantity | Export<br>Price |
| Spain        | 2.20<br>(8.12)     | -1.82<br>(13.88) | 3.09<br>(10.32)    | 6.65<br>(20.24)  | -1.63<br>(6.74)    | 1.28<br>(5.70)  | 1.31<br>(14.35)    | 1.84<br>(24.94) |
| South Africa | 5.43<br>(20.87)    | -1.85<br>(9.71)  | 4.56<br>(18.38)    | 11.47<br>(34.71) | 1.30<br>(3.89)     | 3.86<br>(9.08)  | 5.11<br>(42.69)    | 2.72<br>(29.53) |
| USA          | 0.75               | 0.34             | 3.35               | 4.06             | -3.43              | 3.10            | 0.47               | 2.77            |

|                 |                  |                  |                  |                  |                  |                   |                  |                 |
|-----------------|------------------|------------------|------------------|------------------|------------------|-------------------|------------------|-----------------|
|                 | (26.45)          | (15.60)          | (18.13)          | (15.90)          | (14.72)          | (7.94)            | (21.43)          | (26.90)         |
| Egypt           | -5.01<br>(65.90) | -5.56<br>(16.18) | 14.99<br>(72.06) | 10.15<br>(42.95) | 4.10<br>(27.27)  | -0.39<br>(25.74)  | 6.25<br>(94.45)  | 2.91<br>(43.03) |
| Netherlands     | 4.19<br>(17.06)  | -3.48<br>(10.87) | 1.02<br>(11.04)  | 6.74<br>(30.99)  | 9.45<br>(23.24)  | -3.16<br>(8.32)   | 4.62<br>(27.49)  | 1.63<br>(31.75) |
| Australia       | 14.39<br>(34.74) | 1.13<br>(9.80)   | -3.37<br>(15.72) | 5.23<br>(19.09)  | 7.08<br>(15.54)  | 1.86<br>(7.47)    | 6.38<br>(29.04)  | 2.79<br>(24.08) |
| Hong Kong       | 16.41<br>(70.55) | -0.02<br>(11.17) | 2.42<br>(25.85)  | 2.85<br>(17.36)  | 23.35<br>(57.58) | -0.79<br>(7.62)   | 12.20<br>(71.27) | 1.10<br>(18.12) |
| Turkey          | 2.33<br>(32.15)  | -1.10<br>(12.80) | 9.85<br>(34.06)  | 8.25<br>(34.41)  | 3.57<br>(12.96)  | -10.59<br>(21.66) | 6.06<br>(61.69)  | 0.34<br>(29.52) |
| Greece          | -0.47<br>(28.91) | -1.60<br>(13.71) | -0.41<br>(28.69) | 5.64<br>(22.03)  | -2.85<br>(19.39) | -0.91<br>(9.70)   | 0.26<br>(27.33)  | 1.51<br>(30.98) |
| Italy           | -1.06<br>(17.12) | -1.44<br>(14.95) | -0.90<br>(25.08) | 7.86<br>(24.21)  | -0.59<br>(12.00) | 4.34<br>(10.17)   | -1.29<br>(19.54) | 3.07<br>(31.37) |
| Other Countries | -2.75<br>(9.95)  | 1.15<br>(10.86)  | 0.86<br>(15.61)  | 6.20<br>(18.06)  | 0.19<br>(3.64)   | -0.14<br>(6.74)   | -0.55<br>(11.53) | 2.77<br>(28.63) |

Source: DGCIS, FAOSTAT & CMIE; Note: Figure in parenthesis indicates the CV (%)

### 3.2. Export Price Elasticity of Fruit Crops in Major Producing Countries:

Export quantities are highly sensitive to modify the global prices, which is of higher prominence. Price elasticity's of exports are signals for exporters to modify either rise or diminish their exports as they imply export sensitivity to change in price.

#### 3.2.1. Export Price Elasticity of Grapes for Major Producing Countries in the World:

Export price elasticity (%) of grapes for major producing countries in the world have depicted in the Table 5. Export price elasticity of grapes in all the countries was found to be inelastic (<1). It means that an exporting country can fix higher prices for grapes in the overseas market.

An exporting country should export to Chile, USA, Netherlands, Italy, China, Peru, South Africa, Hong Kong, Spain, Australia and India since grapes have marginally greater demand in all those countries due to inelastic nature of grapes.

**Table 5: Exports Price Elasticity (%) of Grapes for Major Producing Countries in the World (1990-91 to 2017-18)**

| Country         | 1990-91 to 2000-01 | 2001-02 to 2011-12 | 2012-13 to 2017-18 | 1990-91 to 2017-18 |
|-----------------|--------------------|--------------------|--------------------|--------------------|
| Chile           | 0.90               | 0.16               | 0.87               | 0.20               |
| USA             | 0.58               | 0.22               | 1.20               | 0.23               |
| Netherlands     | 1.77               | 0.55               | 1.49               | 0.71               |
| Italy           | 2211.79            | -0.50              | 0.18               | 0.27               |
| China           | 1.76               | 0.63               | 0.93               | 0.73               |
| Peru            | 0.09               | 0.70               | 1.03               | 0.23               |
| South Africa    | 1.43               | 0.17               | 1.09               | 0.65               |
| Hong Kong       | 1.72               | 0.45               | 1.83               | 0.91               |
| Spain           | 2.14               | 0.17               | 0.71               | 0.22               |
| Australia       | 1.29               | -0.04              | 0.92               | 0.55               |
| India           | 1.00               | 0.86               | 0.56               | 0.59               |
| Other Countries | 1.17               | 0.42               | 2.80               | 0.80               |

Source: FAOSTAT, DGCIS & CMIE

### 3.2.2. Export Price Elasticity of Bananas for Major Producing Countries in the World:

Export price elasticity of bananas for major producing countries in the world have portrayed in the Table 6. Panama has shown negative export price elasticity (-3.23). The export price elasticity's of Ecuador, Costa Rica, Philippines, Colombia, Guatemala, Netherlands, USA and Germany were 0.36, 0.30, 0.36, 0.38, 0.53, 0.92, 0.44 and 0.86, respectively. This showed that export price elasticity of banana was found to be inelastic except Panama. It means an exporting country can export apples to all countries except Panama.

The study found that an exporting country could be benefitted by exporting the bananas to Ecuador, Costa Rica, Philippines, Colombia, Guatemala, Netherlands, USA and Germany. An exporting country can fix higher export prices for the banana to all countries except Panama as the export price elasticity of all countries were inelastic in nature except Panama.

**Table 6: Exports Price Elasticity (%) of Bananas for Major Producing Countries in the World (1990-91 to 2017-18)**

| Country                  | 1990-91 to 2000-01 | 2001-02 to 2011-12 | 2012-13 to 2017-18 | 1990-91 to 2017-18 |
|--------------------------|--------------------|--------------------|--------------------|--------------------|
| Ecuador                  | 1.12               | 0.26               | 0.55               | 0.36               |
| Costa Rica               | 0.62               | -0.05              | 0.59               | 0.30               |
| Philippines              | 0.95               | -0.07              | 0.01               | 0.36               |
| Belgium                  | -                  | 0.32               | -0.25              | -                  |
| Colombia                 | 0.97               | 0.32               | 0.80               | 0.38               |
| Guatemala                | 0.87               | 0.48               | 0.71               | 0.53               |
| Netherlands              | -181.01            | 0.64               | 1.05               | 0.92               |
| United States of America | 71.31              | 0.16               | 13.62              | 0.44               |
| Germany                  | 1.10               | 0.61               | 1.73               | 0.86               |
| Panama                   | 1.13               | 1.30               | 0.08               | -3.23              |
| Other Countries          | 3.01               | 0.38               | 0.83               | 0.76               |

Source: FAOSTAT, DGCIS & CMIE

### 3.2.3. Export Price Elasticity of Mangoes for Major Producing Countries in the World:

Export price elasticity of mangoes for major producing countries in the world have depicted in the Table 7. Spain was shown the highest export price elasticity of mangoes (1.79). All countries except Spain and the Netherlands have shown inelastic exports price of mangoes.

The study found that export price elasticity of mangoes was marginally higher in the Spain and the Netherlands.

**Table 7: Exports Price Elasticity (%) of Mangoes for Major Producing Countries in the World (1990-91 to 2017-18)**

| Country | 1990-91 to 2000-01 | 2001-02 to 2011-12 | 2012-13 to 2017-18 | 1990-91 to 2017-18 |
|---------|--------------------|--------------------|--------------------|--------------------|
| Mexico  | 0.82               | 0.71               | 0.59               | 0.41               |

|                 |        |       |       |      |
|-----------------|--------|-------|-------|------|
| Netherlands     | 2.48   | 0.45  | 0.79  | 1.12 |
| Viet Nam        | -      | 1.48  | 0.65  | -    |
| Thailand        | 0.29   | 0.70  | 0.21  | 0.22 |
| Brazil          | 1.18   | 0.19  | 0.85  | 0.54 |
| Peru            | 0.79   | 1.11  | 1.06  | 0.76 |
| India           | -18.71 | 0.41  | -2.15 | 0.84 |
| Spain           | 3.38   | 0.54  | 0.66  | 1.79 |
| Philippines     | 1.31   | -0.12 | 0.14  | 0.21 |
| Ghana           | -      | 0.04  | 0.31  | -    |
| Egypt           | 15.09  | 1.00  | 0.44  | 0.49 |
| Other Countries | 1.56   | 0.51  | -0.16 | 0.59 |

Source: FAOSTAT, DGCIS & CMIE

### 3.2.4. Exports Price Elasticity of Oranges for the Major Producing Countries in the World:

Export price elasticity of oranges for major producing countries in the world have represented in the Table 8. There is negative export price elasticity of oranges observed in Italy (-0.50) and other countries (-0.17). Export price elasticity of oranges in Spain, South Africa, USA, Egypt, Netherlands, Australia, Hong Kong, Turkey and Greece were 0.32, 0.41, 0.10, 0.41, 0.56, 0.42, 0.73, 0.89 and 0.12, respectively.

The study found that the export price elasticity of oranges was inelastic in all countries and the negative elasticity was observed in the Italy and the other countries.

**Table 8: Exports Price Elasticity (%) of Oranges for Major Producing Countries in the World (1990-91 to 2017-18)**

| Countries    | 1990-91 to 2000-01 | 2001-02 to 2011-12 | 2012-13 to 2017-18 | 1990-91 to 2017-18 |
|--------------|--------------------|--------------------|--------------------|--------------------|
| Spain        | 7.11               | 0.23               | 4.28               | 0.32               |
| South Africa | 1.71               | 0.16               | 0.23               | 0.41               |
| USA          | 0.68               | 0.36               | 7.43               | 0.10               |
| Egypt        | 0.61               | 0.32               | 1.12               | 0.41               |
| Netherlands  | 8.78               | 0.10               | 1.69               | 0.56               |

|                 |      |       |       |       |
|-----------------|------|-------|-------|-------|
| Australia       | 0.86 | -1.61 | 0.75  | 0.42  |
| Hong Kong       | 1.00 | 0.40  | 1.06  | 0.73  |
| Turkey          | 2.03 | 0.33  | -0.60 | 0.89  |
| Greece          | 0.25 | -0.06 | 0.78  | 0.12  |
| Italy           | 0.45 | -0.09 | -0.15 | -0.50 |
| Other Countries | 1.61 | 0.09  | 4.00  | -0.17 |

Source: FAOSTAT, DGCIS & CMIE

### 3.3. Top 10 Export Destinations of Indian Fruits in the world:

Export destinations of India's grapes, bananas, mangoes and oranges were shown from the Table 9 to 12. India is exporting these fruit crops to 150 countries approximately. Top 10 countries which hold major share of exports were categorized and assessed from each commodity. USA, Germany and the Netherlands shared 15.18%, 11.12% and 7.29% of total quantity and 18.42%, 10.23% and 9.06% of total value of grapes in the world, respectively during the study period (From Table 11). USA, Germany and Belgium shared 25.60%, 8.05%, 7.71% of total quantity and 17.63%, 9.68% and 13.48% of total value to the global bananas, respectively (From Table 12). USA, Viet Nam and the Netherlands shared 33.27%, 15.45% and 11.52% of total quantity and 24.96%, 13.20% and 13.60% of total value in the global mangoes, respectively (From Table 13). Germany, France and the Netherlands shared 9.63%, 8.65% and 7.86% of total quantity and 9.68%, 9.67% and 7.82% of total value in the global oranges, respectively (From Table 14).

**Table 9: Export Destinations of Indian Grapes among Top 10 Countries in the world  
(1990-91 to 2017-18)**

| Name of the Countries | Total Quantity | % of Total Quantity to World | Total Value | % of Total Value to World |
|-----------------------|----------------|------------------------------|-------------|---------------------------|
| USA                   | 453722.4       | 15.18                        | 894570.8    | 18.42                     |
| Netherlands           | 217831.8       | 7.29                         | 439663.6    | 9.06                      |
| Germany               | 332383.8       | 11.12                        | 496729.5    | 10.23                     |
| UK                    | 198718.5       | 6.65                         | 428204.8    | 8.82                      |
| China                 | 201345.4       | 6.73                         | 402111.8    | 8.28                      |
| Hong Kong             | 107117.4       | 3.58                         | 208618.8    | 4.30                      |

|                    |                |               |                |               |
|--------------------|----------------|---------------|----------------|---------------|
| Canada             | 165682.2       | 5.54          | 285491.8       | 5.88          |
| Russian Federation | 209444.7       | 7.01          | 227865.4       | 4.69          |
| France             | 148436.9       | 4.96          | 181831.3       | 3.75          |
| Indonesia          | 26006.43       | 0.87          | 54516.71       | 1.12          |
| Other Countries    | 944160.8       | 31.58         | 1251875        | 25.78         |
| <b>World</b>       | <b>2989890</b> | <b>100.00</b> | <b>4855203</b> | <b>100.00</b> |

Source: DGCIS, APEDA, FAOSTAT & CMIE

**Table 10: Export Destinations of Indian Bananas among Top 10 Countries in the world  
(1990-91 to 2017-18)**

| Name of the Countries | Total Quantity  | % to Total Quantity to World | Total Value    | % to Total Value to World |
|-----------------------|-----------------|------------------------------|----------------|---------------------------|
| USA                   | 3964493         | 25.60                        | 1585077        | 17.63                     |
| Belgium               | 1194834         | 7.71                         | 1211922        | 13.48                     |
| Russian Federation    | 817910.7        | 5.28                         | 487116.8       | 5.42                      |
| Germany               | 1246249         | 8.05                         | 870486.6       | 9.68                      |
| Japan                 | 969050.2        | 6.26                         | 633659.9       | 7.05                      |
| UK                    | 834453.3        | 5.39                         | 593319.3       | 6.60                      |
| Netherlands           | 269761.9        | 1.74                         | 183954.5       | 2.05                      |
| China                 | 471253.6        | 3.04                         | 212460.2       | 2.36                      |
| France                | 493517.9        | 3.19                         | 354412.5       | 36.88                     |
| Italy                 | 602175.8        | 3.89                         | 416638.5       | 3.94                      |
| Other Countries       | 5712626         | 36.88                        | 3325800        | 36.99                     |
| <b>World</b>          | <b>15489001</b> | <b>100.00</b>                | <b>8990586</b> | <b>100.00</b>             |

Source: DGCIS, APEDA, FAOSTAT & CMIE

**Table 11: Export Destinations of Indian Mangoes among Top 10 Countries in the world  
(1990-91 to 2017-18)**

| Name of the Countries | Total Quantity | % of Total Quantity to World | Total Value | % of Total Value to World |
|-----------------------|----------------|------------------------------|-------------|---------------------------|
| USA                   | 259842.1       | 33.27                        | 226435.4    | 24.96                     |
| Netherlands           | 89972          | 11.52                        | 123359.5    | 13.60                     |
| Viet Nam              | 120698.8       | 15.45                        | 119717.5    | 13.20                     |
| Germany               | 35314.64       | 4.52                         | 65958.64    | 7.27                      |
| UK                    | 37568.46       | 4.81                         | 64527.29    | 7.11                      |
| France                | 29628.46       | 3.79                         | 57528.5     | 6.34                      |
| United Arab Emirates  | 48930.32       | 6.26                         | 37019.46    | 4.08                      |
| Spain                 | 14713.64       | 1.88                         | 23475.93    | 2.59                      |
| Portugal              | 13048.82       | 1.67                         | 21245.14    | 2.34                      |
| Belgium               | 19806.33       | 2.54                         | 33961.89    | 3.74                      |
| Other Countries       | 589124         | 75.43                        | 615614.4    | 67.86                     |
| World                 | 781061         | 100.00                       | 907202      | 100.00                    |

Source: DGCIS, APEDA, FAOSTAT & CMIE

**Table 12: Export Destinations of Indian Oranges among Top 10 Countries in the world (1990-91 to 2017-18)**

| Name of the Countries | Total Quantity | % of Total Quantity to World | Total Value | % of Total Value to World |
|-----------------------|----------------|------------------------------|-------------|---------------------------|
| France                | 469895.7       | 8.65                         | 331542.6    | 9.67                      |
| Netherlands           | 427315.5       | 7.86                         | 268177.1    | 7.82                      |
| Germany               | 523065         | 9.63                         | 332133.7    | 9.68                      |
| China                 | 63256.25       | 1.16                         | 59669.36    | 1.74                      |
| Hong Kong             | 196874.8       | 3.62                         | 164320.8    | 4.79                      |
| Russian Federation    | 407029.3       | 7.49                         | 239365.3    | 6.98                      |
| UK                    | 318028.8       | 5.85                         | 195354.8    | 5.70                      |
| Republic of Korea     | 83118.54       | 1.53                         | 93672.68    | 2.73                      |

|                 |          |        |          |        |
|-----------------|----------|--------|----------|--------|
| Canada          | 200841.3 | 3.70   | 134910.5 | 3.93   |
| Saudi Arabia    | 290014.1 | 5.34   | 119646.3 | 3.49   |
| Other Countries | 2483246  | 45.70  | 1508051  | 43.97  |
| World           | 5433612  | 100.00 | 3429747  | 100.00 |

Source: DGCIS, APEDA, FAOSTAT & CMIE

The study showed that the major destinations are USA, Germany and Netherlands for Indian grapes; USA, Belgium and Germany for Indian bananas; USA, The Netherlands and Viet Nam for Indian mangoes; and, Germany, France and Netherlands for Indian oranges.

#### 4. Conclusions:

Fruits play an important role in human diet as they provide the essential vitamins, minerals, phytochemicals and fiber required to maintain better health. Globally, India ranks second in production of the fruits after China. The selected fruit crops were grapes, mangoes, banana and oranges for the study purpose because those were major export fruit crops in the world. The secondary data sources were FAOSTAT, DGCIS, APEDA, CMIE and Horticultural Statistics at a glance 2018. The present study analyzed the exports growth rate, instability and elasticity of fruit crops in major producing countries from each commodity also dealt with the major export destinations of Indian fruit crops. Peru, Spain and Chile exported grapes with the highest prices in the global market. Except export quantity of China and Peru, the export quantity and price of grapes was stable in all countries. Netherlands exported more quantity of bananas followed by Germany and Guatemala. Panama exported apples with higher price across the world followed by Philippines and Ecuador. Stability in the banana prices were observed in all countries across the world. Spain exported more number of mangoes followed by Peru and Netherlands. Thailand exported mangoes with higher prices followed by Philippines and Mexico. Egypt and Turkey exported more number of oranges after Hong Kong. Italy exported oranges with higher prices followed by Egypt and Australia. An exporting country should export to Chile, USA, Netherlands, Italy, China, Peru, South Africa, Hong Kong, Spain and Australia since grapes have marginally greater demand in all those countries due to inelastic nature of grapes. The study found that an exporting country could be benefitted by exporting the bananas to Ecuador, Costa Rica, Philippines, Colombia, Guatemala, Netherlands, USA and Germany. Since an exporting country can fix higher export prices for the

banana to all countries except Panama as the export price elasticity of all countries was inelastic except Panama. The study found that export price elasticity of mangoes was marginally higher in the Spain and the Netherlands. Export price elasticity of oranges was inelastic in all countries and the negative elasticity was observed in the Italy and the other countries. The study showed that the major destinations are USA, Germany and Netherlands for Indian grapes; USA, Belgium and Germany for Indian bananas; USA, the Netherlands and Viet Nam for Indian mangoes; and, Germany, France and Netherlands for Indian oranges.

#### Suggestions:

The research revealed that fruits have marginally higher overseas demand due to its health benefits from developed and developing countries. Globally, this research gave new and additional data for importing countries to comprehend competition of global fruit crop prices. This study assists to plan the major price policies and schemes on fruit crops and also to expand exports for foreign earnings of fruit crops globally. Exporting countries has to take up multi-strategic schemes to increase the production of fruits and enlarge the global marketing by discovering new markets. Individual countries should look for newly developed and highly regulated markets for the fruit crops.

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