

# India's Horticultural Export Markets: Growth Rates, Elasticities, Global Supply Chains, and Policies

M. B. Dastagiri

National Academy of Agricultural Research Management, Hyderabad, India

Email: [dgiri\\_mb@yahoo.co.in](mailto:dgiri_mb@yahoo.co.in)

**How to cite this paper:** Dastagiri, M.B. (2017) India's Horticultural Export Markets: Growth Rates, Elasticities, Global Supply Chains, and Policies. *Modern Economy*, 8, 847-864.

<https://doi.org/10.4236/me.2017.87059>

**Received:** May 8, 2017

**Accepted:** July 7, 2017

**Published:** July 12, 2017

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## Abstract

Digital Economy, Ecommerce and fortune economy depend on export market information. Globally, horticulture industry is one of the noteworthy sectors. India is major fruit and vegetable basket of the world. This study estimates exports, price growth rates, elasticity's, identifies major destinations and trace global supply chains for horticultural commodities. The study period is 1990-1991 to 2012-2013. Compound annual growth rates, elasticities and instability index are the methodological tools employed. All fruits', vegetables' and flowers' elasticities are shown to be elastic excluding walnut & mushrooms. Tea's & Coffee's elasticities are elastic. The supply chain channels to Europe, UK, US and Middle East highly developed and no middlemen involved. In case of South Asia, Africa and South East Asia, lengthy and middlemen involved. Global supply chain model must be connecting directly producers with exporters and importers or consumers of importing countries. This is possible digitalization of data and single window processing.

## Keywords

Export Markets, Growth Rates, Elasticities, Global Supply Chains, Policies

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## 1. Introduction

Global Horticulture Market Outlook 2015 projects that horticulture industry plays vital role in the future. The globe has initiated measures to support this industry. In 2011, global fruits and vegetables production were 548 million tonnes and 990 million tonnes respectively. And the global floriculture industry size was around USD 109 billion [1].

Globalization has witnessed the focus on integration of developing country firms geographically with PAN world with supply networks or commodity

chains. These global supply chain linkages help to connect developing countries' firms with developed countries' suppliers and customers. Gereffi [2] [3], emphasises not only that independent companies in different countries are linked together in trading relationships, but also that the chain should be considered as a network governed to a large extent by key agents within it. Watts's paper focused on the trade in fresh vegetables and said that this sector has become one of the most vibrant sectors in international trade, and during the 1990s, imports of fruit and vegetable products by EU countries surpassed all other categories of agricultural products (Watts 1994).

Gereffi [3] reported GCCs [Global Commodity Chains] novel in increasingly organizing international production and trade in strategic decision making and economic networks at global scale by industrial and commercial firms. Gereffi [2] classified the commodity chains as producer-driven and buyer-driven. Producer-driven commodity chains are governed by transnational firms and buyer-driven commodities are governed by retailers, importers and brand-name companies. These firms link overseas factories and traders with evolving product niches in their main consumer markets.

India is one of the largest agrarian economies of the world. In the context of economic liberalization, it promotes export led growth. The Indian National Agriculture Policy (NAP) focuses more on demand driven agricultural growth in domestic and export markets. Of late, WTO trade liberalization and multilateral negotiations also focus more on international agricultural commodity markets in the light of improvement of market access and limitation of export subsidies.

Horticulture marketing defined as finding out what your customers want and supplying it to them at a profit therefore involves: identifying buyers, understanding what they want in terms of products and how they want to be supplied, operating a production-marketing chain that delivers the right products at the right time and making enough profit to continue to operate.

Horticultural sector contributes 54% of agricultural Exports and 28% of AgGDP in India. Over the last decade this sector has grown at the growth rate of 3.6 percent. NHB, 2011 reported that India is second largest producer of fruits and vegetables in the world next only to China. This tremendous production potential offers India's greater opportunities for exports. India produced in 2010-11, 146.55 MTs of vegetables and 74.88 MTs of fruits. And its requirement is 175.2 MTs vegetables and 74.40 MTs fruits. In 2011-12, India exported vegetables and fruits worth Rs. 4801.29 crores. The consumption basket is changing towards fruits and vegetables. National Horticultural Mission started in 2005, Foreign Trade Policy (2004-09) advocating to boost export growth and promotion of horticultural products. XI & XII Plans also emphasizing accelerated horticultural growth.

India is one of the world's leading producers of finest tea with 23 per cent share by volume in 2013. Its contribution is 12 per cent share in world tea exports in 2013-2014. The CIS countries accounted for 19.8 per cent of total exports in 2013-2014 with US\$ 152.46 million. India registered exports of 225.7 million kg. for

approximately 78 per cent of total exports during 2013-2014 [4]. In 2013-2014, the Russian federation was the topmost importer of Indian tea, followed by UAE and Iran respectively.

Coffee Board, 2014 reported that India ranked in coffee production seventh largest in the world and third largest Asia. India exported coffee during 2013-2014, 313,025 metric tonnes and earned foreign revenue 793.22 US\$ million. India exports coffee to over 45 countries, over 50 per cent of to Europe. Italy is the largest importing more than 25 per cent from India [5].

We are living in multi-speed world economies. Horticultural commodities play significant role in living economics. World Development Report [6] reported that markets are central to the lives of poor people and World Bank, World Development Report [7] framed institutions that support the development of markets.

UNCTAD [8] study revealed that India's exports to world are income elastic and found that 1% decline in GDP growth of world will lead to 1.88% decline in India's growth of exports. Singh and S. K. Singla [9] found from their study (1992 to 2006) that India has been unable to diversify its exports as well as export destinations. Export from India has experienced instability primarily in the developing countries. Demand for India's exports was found to be elastic to both relative prices and income of the importing countries. Traill [10] predicts that by 2015 supermarket's share of the retail food market will reach 61% in Argentina, Mexico, and Poland, 67% in Hungary and 76% in Brazil. IFPRI's [11] research shown that agricultural Market reforms liberalization programs adopted by many developing countries in the past had limited success in developing private, efficient, and competitive agricultural markets. Dastagiri and Immanuelraj [12] advocates reforms needed to shift Indian farming from traditional farming to an agribusiness sector and develop linkages farmers to super markets and export markets is a key driver for industrialization of agriculture.

Alberto and Stefano [13] estimated import price demand elasticity in the destination markets of Italian exports found that Italy has a relatively low elasticity of substitution in main specialization sector (machinery and equipment), while has higher substitution elasticity for traditional goods like textiles, jewelry and leather. Reardon and Hopkins [14]; Minton (2008) found that super markets and retailers competing on price, convenience, quality of the products and safety. Mithofer *et al.* [15] found that smallholders were linked to the export market by middlemen in Kenya. Galanopoulos *et al.* [16] reported that though Mediterranean countries are traditional growers of fruit and vegetables but unable to competitive in the global market. Dastagiri *et al.* [17] estimated and found that for all vegetables the NPC is less than 1 indicating they are competitive in the international markets. Lenné & Ward [18] found that the export vegetable sub-sector as a role model for improving the efficiency, growth and economic value of domestic vegetable marketing systems in East Africa. Dastagiri *et al.* [19] reported that most of the Indian horticultural commodity markets were operating efficiently and producer-consumer was the most efficient channel. Diego *et al.*

[20] found in Niamey, Niger for market retailers net profit (NP) for amaranth and lettuce on marketplace, whereas the NP of cabbage and tomato strongly depended on season and marketplace.

This paper examines the position of Indian producers and exporters in the horticultural export trade from the perspective of the global supply chain analysis. There are limited studies on market research of horticulture commodity global supply chains and identification of major global markets. This study analyses Indian horticultural commodities export markets linking to global supply chains and price trends, elasticity's and instability & identification of their destinations. Finally, the study will suggest multispeed strategies for improvement of global supply chains, prices, production, and trade.

The Specific Objectives are:

- 1) To analyze exports price growth rates of India's horticultural commodities.
- 2) To estimate export elasticity's for Indian fruits, vegetables, flowers and Tea & Coffee.
- 3) To identify major destinations for horticultural commodities and their share in world horticultural exports.
- 4) To trace India's horticultural commodities Global Supply chains.
- 5) To suggests polices and strategies for boosting Indian horticultural exports and foreign earnings.

## 2. Methodology

The study analyses the marketing of horticultural commodities exports with global supply chain perspective. India's major export horticultural commodities were selected. It includes fruits, nuts, vegetables, flowers, coffee and tea. Study Period is 1990-1991 to 2012-2013. Data on quantity, values, and prices of exports, international prices and destinations of fruits, vegetables, flowers coffee and tea were collected. India is exporting these commodities to maximum 130 countries. Data sources are Agricultural Produce Export Development Authority (APEDA), Directorate General of Commercial Intelligence (DGCIS), National Horticultural Board (NHB), FAO Stat, Centre for monitoring on Indian economy (CMIE), Foreign Trade Year Book, Planning commission reports, National Bank for Agricultural and Rural Development (NABARD), EXIM Bank, export companies, Tea & Coffee Boards. Compound annual growth rates and trends of quantity exports, prices, and price elasticity's of exports were estimated. For each commodity, the countries classified in to the top 10 countries based on major share of exports and rest as other countries. Finally top 3 countries of India's exports for each commodity are identified. India's horticultural commodities global supply chains traced with the help of experts of export companies, growers and literature. The compound growth rates, price elasticity's, instability index of exports were estimated using the following formulae's.

***Growth rate formulae:*** [21]

The growth rates were calculated by fitting Exponential function for exports, prices etc for the period 1990-1991 to 2012-2013.

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

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

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

where,  $A (= \ln A_0)$  and  $B (= \ln(1+r))$  are the parameters to be estimated by ordinary least square regression,  $t$  = time trend in year,  $r = \exp(B) - 1$

#### **Price elasticity of exports formulae.**

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

The percentage change in quantity exports is  $\% \Delta Q$ , and the percentage change in price is  $\% \Delta P$ . We calculate  $\% \Delta Q$  as  $\Delta Q / Q_{ave}$  and we calculate  $\% \Delta P$  as  $\Delta P / P_{ave}$ , so we calculate the price elasticity of exports as  $(\Delta Q / Q_{ave}) / (\Delta P / P_{ave})$ .

#### **Instability Index formulae:**

$$\text{Coefficient of Variation} = \frac{\text{Standrd Deviation}}{\text{Mean}} * 100$$

### **3. Results and Discussion**

#### **3.1. Exports, Price Growth Rates, Elasticity's, Destinations, of Fruits, Vegetables & Flowers**

##### **3.1.1. Exports, Price Growth Rates**

The quantity of exports and export price growth rates (%) of India's fruits, vegetables and flowers during 1990-2012 are shown in **Table 1** & **Table 2**. The export growth rates of fruits such as Banana, Mango, Pomegranate, Grapes are 19.6%, 5.8%, 19%, 14.4% respectively. Mango and Grapes exports are stable as their coefficient of variation is less than 100 percent whereas Banana and pomegranate are instable as their coefficient of variation is more than 100 percent. The export growth rates of fruits such as Mango, Pomegranate, and Grapes are more during 1990-2000 compared to 2000-2012.

Whereas export growth rates of vegetables such as Onion, Gherkin, Green chillies, potato are 8.4%, 23%, 5%, 13.1%, -28.9% respectively. The export growth rate for Rose is 7.8% and walnut is -8%. During 2000-2012, all variables growth rates of Green Chillies are negative because of low export prices and lack of demand during this period. Onion and Gherkins exports are stable as their coefficient of variation is less than 100 percent whereas Green chillies and Potato exports are instable as their coefficient of variation is more than 100 percent. It was found that the growth rates are positive for fruits, vegetables and flowers and for mushrooms and walnut are negative. The price growth rates of fruits such as Mango, Pomegranate, Grapes, Banana are 3.5%, 6.7%, 6.2%, 1.7% respectively. Similarly, vegetables price growth rates are Onion 6.1%, Gherkin 3.7%, Green chillies 0.8%, Potato 3.7%, and Mushrooms 5.4%. The Rose price growth rate is 30.6% and walnut is 6.5%. The study found that the price growth rates of all fruits, vegetables and flowers are positive and high.

It was found that the export growth rates of fruits, vegetables and flowers are

positive except mushrooms and walnut. Contrastingly price growth rates for all commodities in the export destinations were positive and high. The prices of fruits, vegetables and flowers are stable as their coefficient of variation is less than 100 percent. The study concludes that all commodities quantity export growth rates more than price growth rates except walnut and mushrooms.

### 3.1.2. Export Elasticity's

How responsive are export quantities to a change in international prices is of direct relevance in international economics. Export price elasticities are signals for exporters to increase or decrease their exports as it indicates exports responsiveness to changes in price.

The India's fruits, vegetables and flowers export elasticity's during 1990-2012 (%) are shown in **Table 1** & **Table 2**. The elasticities of Fruits such as Banana, Mango, Pomegranate, Grapes are 4.58%, 1.38%, 1.31%, 1.31% respectively. The export elasticity's of Vegetables are Onion 1.15%, Gherkin 1.84%, Green chillies 3.98%, Potato 1.42%. The Rose export elasticity is 0.59% and walnut is 6.68%.

It was found that banana has among fruits high export elasticity (4.38) and Green Chillies among vegetables have high (3.98). All elasticity's of fruits, vegetables and flowers are elastic whereas walnut and mushrooms are inelastic.

### 3.1.3. Export Destinations

India's fruits, vegetables and flowers export destinations and their share in the world exports during 2000-2012 are shown in **Table 1** & **Table 2**. India exports these commodities to ranges from 40 to 130 countries of the world. For each commodity, the countries classified in to the top 10 countries which accounted major share of exports and rest as other countries. Finally, it was found that the top 3 countries which accounted 60% to 78% of India's exports.

The major destinations for Indian mango is UAE (37.20%), Bangladesh (32.66%), Saudi Arabia (9.46%), for Grapes; Bangladesh (29.02%), Netherland (18.29), United Kingdom (15.3%), for Banana; Nepal (78.28%), UAE (6.17%), Maldives (3.13%). for Pomegranate; UAE (48.52%), Bangladesh (12.76%), Saudi Arabia (8.30%). The major destinations for walnut are Nepal (13.08%), United Kingdom (11.52%), France (10.18%).

The major destinations for Indian vegetables are; for Potato; South Africa (29.75%), UAE (11.93%), Pakistan (12.61%), for Onion; Bangladesh (29.77%), Maldives (21.64%), UAE (15.92%), for Green Chillies; United Kingdom (16.30%), Pakistan (13.54%), UAE (12.19%), for Gherkins; USA (20.32%), France (17.75%), Spain (14.88%), for Mushroom; USA (80.93%), Israel (12.65%), Russia (1.27%). Netherland (26.34%), Ethiopia (21.03%), UAE (9.43%) are he major destinations for India's rose are.

The study found that the India is the major shopping basket for world fruits and vegetables. India's 65% - 90% fruits and 50% to 65% vegetables exports in fresh products go to West Asia and East European markets. The 53% exports of Gherkins, 94% Mushrooms going to the USA, United Kingdom, France, Spain,

**Table 1.** Fruits of destination, exports, prices and elasticity's [22] [23] [24] [25].

Crop	Top three promising countries	% of exports	Price Growth rate & CV 1990-91 to 2011-12	Export Qty Growth rate & CV 1990-91 to 2011-12	Elasticity % change from 1990-91 to 2011-12
BANANA	Nepal	78.3	1.1 (83.54)	19.6 (166.15)	4.58
	United Arab Emirates	6.2			
	Maldives	3.7			
GRAPES	Bangladesh	29.0	6.2 (37.26)	14.4 (97.06)	1.31
	Netherland	18.3			
Mango	United Kingdom	15.3			
	United Arab Emirates	37.2	3.5 (34.93)	5.8 (44.08)	1.35
	Bangladesh	32.7			
Pomegranate	Saudi Arabia	9.5			
	United Arab Emirates	48.5	6.7 (58.02)	19.0 (108.30)	1.31
	Bangladesh	12.8			
Walnut	Saudi Arabia	8.3			
	Nepal	13.1	6.5 (36.93)	-8.1 (58.00)	-6.68
	United Kingdom	11.5			
	Spain	9.1			

Source: Food and Agricultural Organization (FAO). 2014 [25] & Agricultural Produce Export Development Authority (APEDA) 2014 [22].

**Table 2.** Vegetables and flowers of destination, exports, prices and elasticity's.

Crop	Country	Total % of Qty	Price Growth rate & CV 1990-91 to 2011-12	Qty Growth rate & CV 1990-91 to 2011-12	Elasticity % change from 1990-91 to 2011-12
Onion	Bangladesh	29.8	6.1 (39.83)	8.4 (69.08)	1.15
	Malaysia	21.6			
	United Arab Emirates	15.9			
Potato	Sri Lanka	44.2	5.1 (65.90)	13.1 (161.49)	1.42
	Nepal	16.8			
Green Chilly	Maldives	9.2			
	United Kingdom	16.3	0.8 (26.94)	5.0 (125.14)	3.98
	Pakistan	13.5			
Gherkins	United Arab Emirates	12.2			
	United States	20.32	3.7 (22.77)	23.0 (70.54)	1.84
	France	17.75			
Mushroom	Spain	14.88			
	United States	80.9		5.4 (151.1)	
	Israel	12.6			
Rose	Russia	1.3			
	Netherland	25.34	-25.1	28.9	
	Ethiopia	21.03			
	United Arab Emirates	9.43			

Source: Food and Agricultural Organization (FAO). 2014 [25].

Israel and Russia. Netherland, Ethiopia and UAE are the major destinations for Indian rose. The major destinations (40%) for Walnut is Nepal, UK and France.

### 3.2. Exports and Overseas Prices Growth Rates of Tea and Coffee

The quantity of exports and export price growth rates (%) of India's Tea and Coffee during 1990-2012 are shown in **Table 3**. The export growth rates of Tea and Coffee are 0.7%, 4.9% respectively. Tea exports are stable as their coefficient of variation is less than 100 percent but Coffee exports are unstable as coefficient of variation more than 100. Singh and S. K. Singla [12] found from their study (1992 to 2006) that exports from India have experienced instability primarily in the developing countries. The price growth rates of Tea and Coffee are 4.8%, 7.7%, respectively. It was found that the prices of Tea Coffee are stable as their coefficient of variation is less than 100 percent. The study concludes that Tea and Coffee commodities quantity export growth rates less than price growth rates.

#### Country Wise Exports and Overseas Prices Growth Rates

##### 1) Coffee

The growth rates of exports and prices of Coffee for major countries are in **Table 4**. During 1996-1997 to 2013-2014, the export growth rates shows that Japan has the highest growth rate (18.3) followed by Newzeland (9.1), Belgium (8.7), Italy (7.0), and France (4.6). Whereas price growth rates shows that Japan has highest growth rates (5.6), followed by Belgium (4.8), Greece (4.2), Italy (4.1) and Newzeland (3.5). This indicates that India should export Coffee to these overseas markets. The exports and prices are stable in these countries.

##### 2) Tea

The growth rates of exports and prices of Tea for major countries are in **Table 5**. During 1996-1997 to 2013-2014, Australia has the highest growth rate (61.0) followed by Japan (48.6), Netherland (34.2), and USA (23.9). The exports are unstable. For the same period the price growth rates shows that USA has the highest growth rates (10.1), followed by Japan (8.3) and Russia (6.9). The prices are stable. This indicates that India should export Tea to these overseas markets.

##### 3) Export Elasticity's

In international Economics How responsive is export quantities to a change in international prices are of direct relevance. Export price elasticity's are signals for exporters to increase or decrease their exports as it measures indicates exports responsiveness to changes in prices.

The export elasticity's of India's Tea and Coffee during 1990-2012 (%) are shown in **Table 6**. During this period the export elasticity's of Tea and Coffee are 13.5%, 61.4 respectively which are highly elastic. This indicates that Tea and Coffee are highly competitive in overseas markets.

### 3.3. Countrywise Tea & Coffee Elasticity's

The Coffee export elasticity's for different overseas markets are in **Table 7**. Dur-



**Table 3.** The exports and international price growth rates of India's Tea & Coffee during 1990-2012 (%).

Exports Qty, Value and Price Growth Rates during 1990 to 2012										
Crop		1990-1991	2000-2001	2011-2012	1990-1991 to 2000-2001		2000-2001 to 2010-2011		1990-1991 to 2011-2012	
					cv	Growth rate	cv	Growth rate	cv	Growth rate
Tea	Qty.	202	187.43	233.4	13.0	-0.8	10.0	2.5	11.4	0.7
	Value	1074.82	1788.71	3174.5	34.1	5.8	26.4	6.6	36.4	5.6
	Price	5.320891	9.54335	13.6011	27.5	6.7	16.8	4.0	28.3	4.8
Coffee	Qty.	85.98	184.9	222.86	168.5	8.9	10.3	2.1	146.2	4.9
	Value	253.32	1184.87	2912.07	57.9	18.7	37.9	10.5	49.7	13.0
	Price	2.946267	6.408167	13.0668	53.5	9.0	34.6	8.2	44.1	7.7

Qty (000 tonnes), Value (Lakh Rs.), Price (Lakh Rs). Source: Food and Agricultural Organization (FAO). 2014 [25].

**Table 4.** Country wise Coffee exports and price growth rate during 1990-2012 (%).

Country	Coffee Growth rates and cv											
	1996-1997 to 2003-2004				2003-2004 to 2013-2014				1996-1997 to 2013-2014			
	Qty	Cv	Price	Cv	Qty	cv	Price	cv	Qty	Cv	Price	cv
GERMANY	1.8	18.0	0.8	0.6	3.0	29.5	0.4	35.7	2.5	29.5	1.5	40.9
GREECE	6.8	29.4	-7.9	0.5	2.8	17.7	13.6	37.7	4.4	30.3	4.2	42.4
FRANCE	22.7	49.0	-9.1	0.5	-6.5	42.1	12.9	40.9	4.6	41.6	3.3	44.3
BELGIUM	21.0	37.7	-7.3	0.5	0.9	32.8	14.1	41.7	8.7	35.2	4.8	48.8
KUWAIT	4.5	25.7	-6.5	0.8	4.3	19.7	10.9	34.7	4.4	84.6	3.3	38.1
ITALY	9.1	23.2	-7.1	0.5	5.6	21.9	12.6	37.5	7.0	36.2	4.1	41.8
JAPAN	-12.3	38.0	-7.5	0.6	-22.3	86.7	15.9	42.4	-18.3	42.8	5.6	44.0
NETHERLAND	2.2	29.4	-8.6	0.6	-7.9	48.5	12.3	39.1	-3.9	53.3	3.2	47.0
NEW ZEALAND	13.9	69.0	-6.1	0.6	5.8	25.2	10.8	36.2	9.1	44.3	3.5	41.3
Others 131 country	-2.2	10.0	-3.9	0.6	2.1	20.1	14.2	37.2	0.3	40.9	6.4	41.2

Qty (000 tonnes), Value (Lakh Rs.), Price (Lakh Rs). Source: Directorate General of Commercial Intelligence and Statistics. 2014 [23].

**Table 5.** Country wise Tea exports and price growth rates during 1990-2012 (%).

Country	Tea Growth rates and cv											
	1996-1997 to 2003-2004				2003-2004 to 2013-2014				1996-1997 to 2013-2014			
	Qty	cv	Price	cv	Qty	Cv	Price	cv	Qty	Cv	Price	cv
USA	0.3	60.5	13.5	46.5	43.6	67.0	7.8	28.3	23.9	104.0	10.1	44.2
U ARAB EMTS	-33.6	58.7	3.8	29.9	35.2	58.1	5.0	33.5	0.9	57.4	4.5	41.1
RUSSIA	24.3	62.0	-8.9	26.0	7.8	33.2	19.6	38.9	14.3	45.2	6.9	51.3
NETHERLAND	14.9	132.8	-6.3	60.1	49.7	108.1	6.7	39.3	34.2	153.6	1.2	50.8
FRANCE	-13.5	106.2	0.1	36.8	38.0	105.2	4.6	32.8	13.9	143.5	2.7	36.6
NEW ZEALAND	-8.1	42.6	-9.0	77.2	39.0	90.0	6.5	38.6	17.2	113.9	-0.2	82.8
JAPAN	28.9	111.9	15.4	51.1	64.2	119.0	3.6	41.0	48.6	152.6	8.3	49.5
AUSTRALIA	141.0	149.8	0.7	100.3	21.3	89.8	7.2	36.9	61.0	136.0	4.5	104.8
KUWAIT	-11.1	55.3	-3.3	17.5	8.6	67.6	5.0	34.2	0.0	74.2	1.5	31.2
Others 141 country	-11.4	95.0	3.6	22.4	32.6	64.8	7.0	33.6	12.3	83.4	5.6	38.9

Qty (000 tonnes), Value (Lakh Rs.), Price (Lakh Rs). Source: Directorate General of Commercial Intelligence and Statistics. 2014 [23].

**Table 6.** Export elasticity's of India's Tea & Coffee during 1990-2012 (%).

Crop	Elasticity		
	1990-91 to 2000-01	2000-01 to 2011-12	1990-91 to 2011-12
Tea	-7.8	19.7	13.5
Coffee	53.5	17.0	61.4

**Table 7.** Export elasticity's of India's Coffee during 1990-2012 (%).

Country	Coffee Elasticity		
	1996-1997 to 2003-2004	2003-2004 to 2013-2014	1996-1997 to 2013-2014
RUSSIA	9.12	-1.99	-25.33
SAUDI ARAB	-0.38	1.13	1.77
AUSTRALIA	-0.31	0.68	1.00
USA	8.55	-1.20	-13.38
ITALY	-0.68	0.60	1.39
JAPAN	2.08	-14.81	-49.68
FRANCE	-0.80	-1.35	1.27
GERMANY	-0.13	0.37	0.77
KUWAIT	-0.44	0.54	1.21
UK	-0.78	0.35	1.57

**Table 8.** Export elasticity's of India's Tea during 1990-2012 (%).

Country	Tea Elasticity		
	1996-1997 to 2003-2004	2003-2004 to 2013-2014	1996-1997 to 2013-2014
AUSTRALIA	22.05	1.70	1.90
BELGIUM	28.21	1.97	1.43
GERMANY	1.00	-4.88	1.00
U ARAB EMTS	-72.21	2.45	0.26
U S A	0.03	1.84	1.21
KUWAIT	4.87	1.46	-0.01
FRANCE	-272.25	2.64	2.42
SINGAPORE	-3.49	2.65	0.99
U K	-0.38	1.42	3.93
NEW ZEALAND	0.87	2.05	-34.58

ing 1996-1997 to 2013-2014, Saudi Arabia has the highest elasticity (1.77) followed by UK (1.57), Italy (1.39), and France (1.27). This indicates that India should export Coffee to these overseas markets compare to other countries. India has comparative advantage to export to Middle East and Europe markets.

The Tea export elasticity's for different overseas markets are in **Table 8**. During 1996-1997 to 2013-2014, UK has the highest elasticity (3.93), followed by

France (2.42), and Australia (1.90). This indicates that India should export Tea to these overseas markets. Tea is export commodity for developed countries.

### 3.4. Export Destinations

India's Tea and Coffee export destinations and their share in the world exports during 1990-1991 to 2011-2012 are shown in **Table 9** to **Table 10**. India exports these commodities to ranges from 40 to 150 countries of the world. For each commodity, the countries classified in to the top 10 countries which accounted major share of exports and rest as other countries. Finally, it was found that the

**Table 9.** India's Coffee export destinations in the world during 1990-2012.

Coffee Export Data				
Country	Total	Total % Qty	Total	Total% of Value
ITALY	863,716.4	28.24	780,337.6	28.73
GERMANY	424,322.7	13.88	392,961.4	14.47
BELGIUM	231,031.5	7.56	217,089.9	7.99
SPAIN	157,941.5	5.16	109,618.5	4.04
USA	121,833.6	3.98	89,178.78	3.28
JORDAN	69,789.23	2.28	82,742.1	3.05
SLOVENIA	106,903.7	3.50	79,262.15	2.92
GREECE	80,660.66	2.64	59,953.72	2.21
RUSSIA	85,979.28	2.81	76,202.74	2.81
NETHERLAND	63,141.38	2.06	50,642.7	1.86
Others 130 country %	852,646.5	27.88	777,892.2	28.64

Source: Directorate General of Commercial Intelligence and Statistics. 2014 [23].

**Table 10.** India's Tea export destinations in the world during 1990-2012.

Tea Export data				
Country	Total Qty	Total % of Qty	Total	Total value of %
AUSTRALIA	26,109.92	18.62	46,468.37	19.35
USA	22,346.14	15.94	43,493.13	18.11
RUSSIA	24,306.87	17.33	39,981.78	16.65
POLAND	5803.65	4.14	9970.51	4.15
IRAQ	10,682.58	7.62	9054.68	3.77
ISRAEL	3770.2	2.69	7968.27	3.32
UK	4725.23	3.37	7376.22	3.07
JAPAN	3162.81	2.26	7279.1	3.03
KAZAKHSTAN	2900.87	2.07	5206.13	2.17
SAUDI ARAB	2879.27	2.05	4982.18	2.07
Total 140 Country %	33,534.64	23.9	58,340.51	24.3

Source: Directorate General of Commercial Intelligence and Statistics. 2014 [23].

top 3 countries which accounted 55% to 60% of India's exports.

The major destinations for Indian Tea is Australia (18.67%), Russia (17.33%) USA (15.94%), for Coffee Italy (28.73%), Germany (13.88), Belgium (7.56%). India has comparative advantage exporting Tea and Coffee to developed countries. This finding is also confirming with elasticity's, export and price growth rates.

### **3.5. Global Supply Chains**

#### **3.5.1. Horticultural Export-Import Companies**

Indian the top leading modern horticultural export and import companies are wide **Table 11**. These leading company's exports fruits, vegetables, cocoa, coconut, coir, herbal plants, medicinal plants and organic products and wide range of products to Middle East and throughout the globe.

#### **3.5.2. Market Players in Horticulture Global Supply Chains**

The agents and their role in modern horticultural global supply chain have shown in **Table 12**. The global supply chain mainly includes producers - exporters - Importers - super markets - consumers. The major market players are exporters, importers and super markets. The producers produce horticultural commodities with high input system and good agricultural practices and sell to exporter. Exporters play major role of processing, packing, storage, and transport to importer. Exporters also do enforcement of procedures, safety and standard issues. Importer buys the product and does trading activity to super markets. Finally, supermarkets will supply commodities to consumer.

#### **3.5.3. Indian Horticultural Commodities Global Supply Chains**

The forward linkages of producers to exporters in India and backward linkages of importer to consumers in importing countries channels are discussed in this section. The Flow of Indian horticultural commodities to Europe, UK and US Shown in **Figure 1** and to Middle East shown in **Figure 2** and to South Asia, Africa and South East Asia shown in **Figure 3**. The supply chain channel to Europe, UK, US shows that growers - exporter - importer - supermarket - consumer. It is highly developed model and no middlemen involved in importing countries. Similarly, the same type of channel found for Middle East countries. In case of South Asia, Africa and South East Asia importing countries supply chain channels lengthy and middlemen involved. The farmers in Developed countries like UK, US, Europe felt the importance of connecting directly customers of domestic and exporters. This helped them to avoid middlemen as these are no way useful in value addition, quality and economic gains. Scientific, planned and organizing came to fore see and predict market signals and demand and supply position in international and local markets. This has increased their income and living standard. South Asia, East Asia, Latin America and Africa (developing countries) the supply channels are lengthy and middlemen are involved. This is major limitation in these countries farmers to realize high income. There is a need to start data harmonization and single window processing. In this connec-

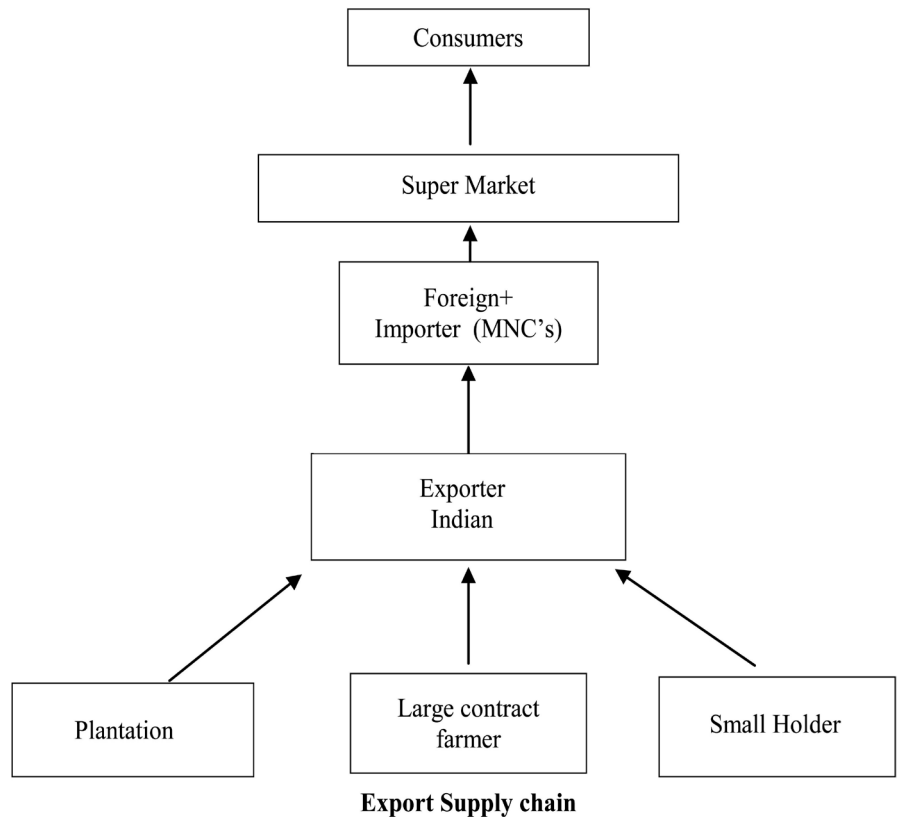
**Table 11.** The top leading modern horticulture export and import companies in India.

Sl No	Export-Import companies	Place	Role
1	Gita International	Kolkata - INDIA	Major exporter fresh cut flowers to clients in Middle-east...
2	Horticultural Impex	Dehradun - INDIA	Leading horticulture seed company offering high quality and high yield seeds at market competitive prices.
3	Royappa Agro International	Coimbatore - INDIA	Genuine Manufacturer, Exporter and Supplier of a wide range of products. Exporting Coco peat(coir) and Supplier of Horticulture imports-exports.
4	Greenvision concepts	Hyderabad - INDIA	Supplier of Horticulture import & export, organic farming and sandalwood farming [+]
5	Elamgreen export & import india private ltd	Pollachi - INDIA	Established in 2010. Traders and Supplier of: Horticulture import-export, coco peat exporter, coir fiber exporter, fresh coconut exporter, coconut husk and husk chip exporter
6	Greeneem agri pvt ltd	Virudhunagar - INDIA	Exporters and Producers of Gree Neem, Neem Oil Bio Pesticide, Neem cake and Supplier of: Horticulture import-export, organic fertilizers, animal husbandry.
7	Herbalexporters	Coimbatore - INDIA	Leading Exporter of Tree herbs, Plants Herbs. Horticulture import-export,  herbs, herbal plants, herbal exporters and treeherbs.
8	Abonna fruits and plants co pvt ltd	Siliguri - INDIA	Leading importer of Berry and Fruit Plants like Blueberry Plants, Blackberry Plants, Raspberry Plants, Strawberry Plants. And supply these plants in all over India. Supplier of Horticulture import-export, berries plants,  strawberry plants.
9	Sri vmt agro tech	Pollachi/coimbatore - INDIA	Founded in 2001. leading Manufacturer, Supplier and Exporter of high quality supplier of Horticulture and import-export coconut fibre, coco peat, coir dust, coir blocks.
10	Milun exports	Madurai - INDIA	Founded in 1993. Manufacturer and exporter of Coco peat products. Coco peat Supplier of Horticulture import-export.
11	Siddha herb inc	Erode-India	Leading exporters of Moringaoleifera products, Neem products, Spices, herbals, Medicinal plants and seeds. Supplier of Horticulture - import-export, moringa, neem,  herbals and medicinal plants.
12	The indian exporters	Sivakasi-India	Started in 2008, leading manufacturer and supplier of Medical Plants. Supplier of: Horticulture - import-export, basmati rice, medicinal herbs.
13	Tanishka coir products	Erode - INDIA	Coconut husk chips, grow medium for horticulture, plants, floriculture, Mashroom cultivation, soil conditioner. Coco peat, coco pith, husk chips are supplied in form of 5 kg. Supplier of: Horticulture - import-export, 1-module coffeemaker, coconut husk chips, coconut fiber, coconut peat.
14	Greenhouse exportters	Tuticorin - INDIA	Seller of Coir Pith, Coco Peat, Coir Fiber, Coconut fiber, Coir geotextiles, Coir from India. Supplier of: Horticulture - import-export, coir geotextiles.
15	Global fruit	Ahmednagar - INDIA	Supplier of: Horticulture - import-export, fruits and vegetables.

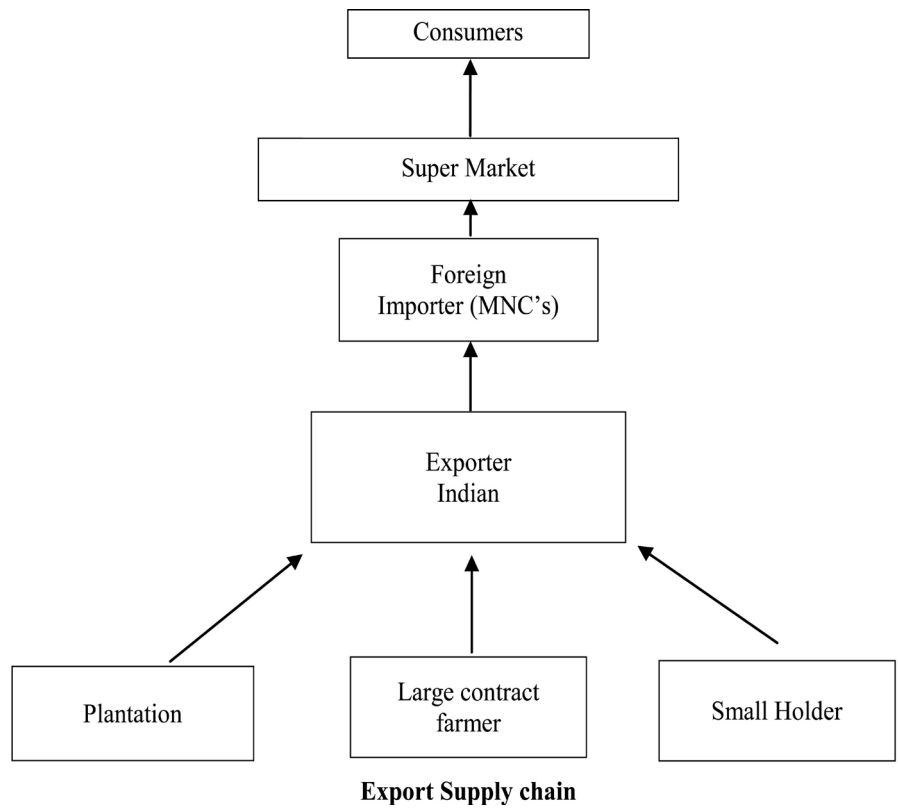
Source: <http://agriculture-livestock.europages.co.uk/companies/India/Horticulture%20-%20import-export.html> dated 29-12-2015 [26] [27] [28].

**Table 12.** The modern horticulture global supply chain players and their role.

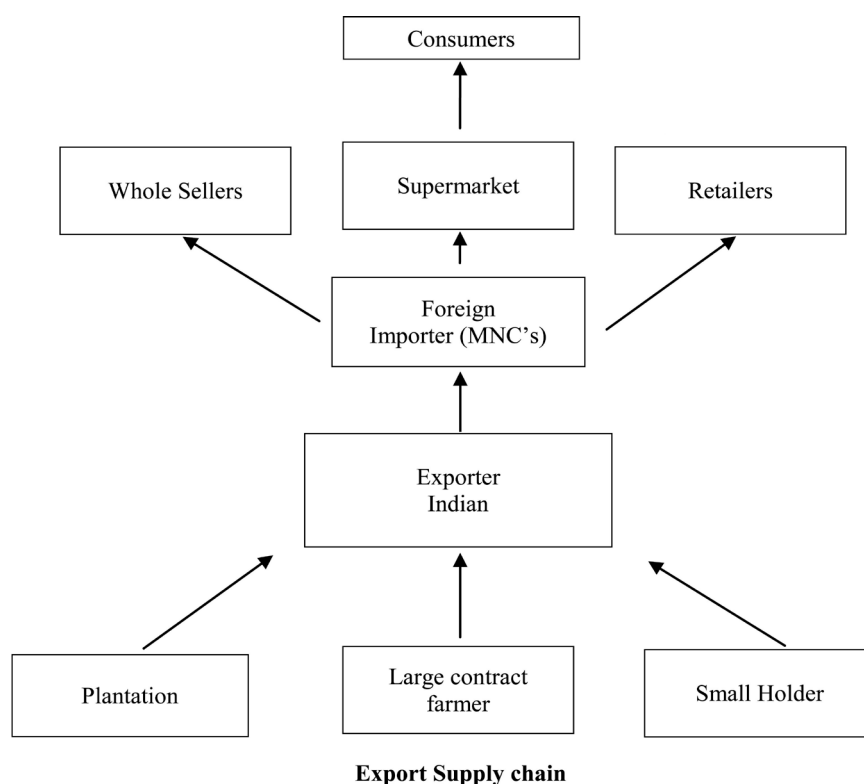
Sl No	Players	Role
1	Producer	High input system e.g. IPM varieties, irrigation Good Agricultural Practices (GAP) Some operating out grower schemes
2	Exporters	Processing, packing, storage, transport, quality assurance system, food safety, human rights, environmental protection, enforcement of procedures
3	Importers	Buying produce from exporter, store product, trading role Ensure quality assurance
4	Super markets	Branding, product information, marketing
5	Consumers	Overseas consumers, USA, UK, Europe, Middle east. And also South Asia and South East Asia



**Figure 1.** Flow of horticultural commodities from India to/for countries of UK and Europe, US.



**Figure 2.** Flow of horticultural commodities from India to/for countries of Middle East.



**Figure 3.** Flow of horticultural commodities from India to/for countries of South Asia, Africa and South East Asia.

tion Digital India will help exporter to access various resources available at government level.

#### 4. Conclusions

The study findings were useful in designing policies and programs for escalating exports and foreign income, recognizing profitable destinations and modern export supply chains. The export growth rates during 1990-2012 (%) of India's fruits, vegetables and flowers are positive except mushroom and walnut. The export growth rates (qty) range from 5.8% Mango to 19.6% banana and vegetables; 8.4% onion to 23% green chillies and rose export growth rate was 7.8%. Mango, grapes, onion and gherkins exports are stable whereas Banana, Pomegranate, Green chillies and Potato are unstable. During this period the price elasticities of exports of fruits, vegetables and flowers are positive except walnut and mushrooms. This implies that Indian exports of these commodities are highly responsive to price changes in the international markets. Among fruits, the highest elasticity was found for banana (4.58%) and among vegetables green chillies recorded high (3.98%). This implies that India should increase exports of these commodities to earn more foreign earnings. Bangladesh, UAE, Pakistan, Malaysia, Sri Lanka, UK, Saudi Arabia, Nepal, Netherland and France are the major destinations (65% - 90%) for Indian fruits. Nepal, UK and France (40%) are the major destinations for walnut. The major share 50% to 65% of India's vegetables (potato, onion, green chillies) are exported to Saudi Arabia, UAE, Pa-

kistan, Malaysia and UK.

The export growth rates during 1990-2012 (%) of India's Tea (0.7%) and coffee (4.9%) are positive. The exports of Tea are stable and of Coffee are unstable. During this period the price elasticities of exports of Tea and Coffee are elastic. Among the highest elasticity was found for Coffee (61.4%) and Tea (13.1%). During 1996-1997 to 2013-2014, Saudi Arabia has showed the highest coffee export elasticity (1.77) followed by UK (1.57), Italy (1.39) and France (1.27). India has comparative advantage to export to Middle East and Europe markets. While during the same period, UK has showed the highest tea export elasticity (3.93), followed by France (2.42) and Australia (1.90). Tea is export commodity for developed countries. The major destinations which accounted 50% to 60% share for Indian Tea and Coffee are Australia, Russia & USA, Italy, Germany, and Belgium.

India has top leading modern horticultural export and import companies. The supply chain channel to Europe, UK, US shows that highly developed model and no middlemen involved. Similarly, the same type of channel found for Middle East countries. In case of South Asia, Africa and South East Asia importing countries supply chain channels lengthy and middlemen involved. UK, Europe, US (developed countries) farmers connecting with direct customers in domestic markets as well exporters. This eliminated middlemen as they are no use in improving quality and commercial gains.

The study helps in designing agricultural policies and programs to increase horticultural exports and foreign earnings in Asia, Africa and East European markets and USA. India should develop modern supply chains and apply multispeed straggles of exports. Scientific, planned and organizing required to foresee demand and supply position in international and local markets. South Asia, East Asia, Latin America and Africa the supply channels are lengthy and middlemen are involved. In this connection Digital India will help in various export activities. The exporter has an access to various resources available at government level. In the Globalization era the global supply chain model must be connecting producers directly with exporters and importers or consumers of importing countries. This is possible digitalization of data and single window processing.

The international trade in general and export marketing in particular is complex phenomenon because of too many variables effects on trade. This study estimated only few indicators such as elasticities, growth rates, market destinations and traced global supply chains. Hence, future research should be focus on more trade parameters and policies influencing on them.

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