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India's Export Horticulture Markets in Multispeed World Economies: Trends of Exports, Prices, Elasticities and Policies

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Author's contribution

The sole author designed, analyzed and interpreted and prepared the manuscript.

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ABSTRACT

We are living in multispeed world economies. The globe has initiated measures to support horticulture industry. India is the fruit and vegetable basket of the world. The vast production base offers India tremendous opportunities for exports. During 2011-12, India exported vegetable and fruits worth Rs. 4801.29 crores. The main objective of the study is to estimate exports, price trends, elasticity's and identifies major destinations for India's fruits, vegetables and flowers. The study period is 1990-91 to 2012-13. The sample size is the time series data of 23 years. The methodology adopted is compound annual growth rates and Coefficient variation of instability index. India is exporting these commodities to 130 countries. The study found that fruits, vegetables, flowers quantity export growth rates positive and high except walnut and mushrooms. Whereas all commodities price growth rates in the export destinations were positive and high. The study found that all elasticity's of fruits, vegetables and flowers are elastic except walnut and mushrooms (inelastic). Among fruits, banana has high export elasticity (4.38%) and among vegetables, green chilies have high (3.98%). Over 65-90% fruits and 50 to 65% vegetables of India's exports in fresh products go to West Asia and East European markets. Exports of Gherkins

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(53%), Mushrooms (94%) going to the USA, United Kingdom, France, Spain, Israel and Russia. The major destinations for India's Rose are Netherland, Ethiopia and UAE and for walnut are Nepal, UK and France (40%). The study strongly advocates that India should design multispeed strategies to boost horticultural exports, foreign earnings and develop modern export supply chains.

Keywords: Export horticultural markets; multispeed world economies; India; exports; prices; elasticities.

1. INTRODUCTION

Global Horticulture Market Outlook 2015 scenario reveals that the horticulture industry is one of the most significant sectors in the world. The globe has initiated measures to support this industry. Global fruit production was reported at 548 million tonnes and vegetable production came in at 990 million tonnes in 2011. For the year 2011, the size of the global floriculture industry stood at around USD 109 billion.

India is the second largest producer of fruits and vegetables in the world next only to China [1]. India produced around 146.55 MTs of vegetables and 74.88 MTs of fruits (2010-11). The country's annual requirement is 74.40 MTs fruits and 175.2 MTs vegetables. The vast production base offers India tremendous opportunities for export. During 2011-12, India exported vegetables and fruits worth Rs. 4801.29 crores. Horticultural sector contributes 54% of agricultural Exports and 28% of AgGDP in India. This sector is growing at an average growth rate of 3.6 per cent over the last decade. The consumption basket is changing towards fruits and vegetables. National Horticultural Mission started in 2005, Foreign Trade Policy (2004-09) emphasized the need to boost export growth and promotion of horticultural products. XI & XII Plans also emphasizing accelerated horticultural growth

We are living in multi-speed world economies. Horticulture plays significant role in living economics. World Development Report [2] points out the markets are central to the lives of poor people. World Bank, World Development Report [3] designed about people building institutions that support the development of markets. It provides a diagnostic framework for understanding how institutions support market activity.

UNCTAD [4] findings show that India's exports to world are very responsive to income changes. A 1% decline in GDP growth of world will lead to 1.88% decline in India's growth of exports to world. Singh and S. K. Singla [5] 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 relatively elastic to both relative prices and income of the importing countries. Traill [6] uses various assumptions and predicts that supermarket's share of the retail food market will reach 61% in Argentina, Mexico, and Poland 67% in Hungary and 76% in Brazil by 2015.

IFPRI's [7] research on agricultural Market reforms shown that the liberalization programs adopted by many developing countries in the past two decades have had limited success in developing private, efficient, and competitive agricultural markets. Sankaralal Guru [8] has reported that an efficient agricultural marketing is essential for the development of the agricultural sector. Dastagiri and Immanuelraj [9] advocates that shifting Indian farming from a rural lifestyle to an agribusiness sector and linking farmers to super markets is a key driver for industrialization of agriculture.

Alberto and Stefano [10] in their study "Measuring the price elasticity of import demand 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, jewellery and leather. Reardon and Hopkins [11] and Minten [12] report that the war between supermarkets and traditional retailers in developing countries takes place on several fronts, such as price, convenience, quality of the products and safety. Mithofer et al. [13] Found in Kenya that more smallholders were linked to the export market by middlemen and flexible arrangements than by an export company. Galanopoulos et al. [14] Found that Mediterranean countries are traditional growers of fruit and vegetables, but are struggling to remain competitive in the global market. Dastagiri et al. [15] Estimated and found that for all vegetables the NPC is less than 1 indicating

they are competitive in the international markets. Lenne & Ward [16] found that the export vegetable subsector as a role model for improving the efficiency, growth and economic value of domestic vegetable marketing systems in East Africa. Dastagiri et al. [17] found that the majority of Indian horticultural commodity markets were operating efficiently, while the most efficient channel was producer–consumer. Diego et al. [18] found in Niamey, Niger that for amaranth and lettuce, the net profit (NP) of market retailers depended only on marketplace, whereas the NP of cabbage and tomato strongly depended on season and marketplace.

Bhatia [19] stated that as the Indian agricultural sector has grown rapidly over the last decade with a considerable rise in productivity making it an important sector of the economy, the agricultural marketing structure has not developed sufficiently to accommodate this growth. The study assesses the current agricultural marketing structure in India and considers the development of the sector through the introduction of reform policies and programmes.

Several studies [20-22] were done market research on traditional areas/conventional crops. Some studies [23,24] were mainly focused on traditional marketing channels. Limited scientific studies on the emerging/newer institutional marketing models are available [25]. Dastagiri [17] found that the direct market models are found to be the best because the producer share in consumer rupee is 100% and will eliminate completely middlemen.

There are limited studies on market research of horticultural exports markets and identification of major destinations. This study analyses exports, price trends and elasticity's of major Indian horticultural commodities and identification of their destinations. Finally, the study will suggest multispeed strategies for improvement of prices, production and trade of horticultural commodities.

The specific objectives of the study are:

1. To analyze exports, price growth rates and trends behaviour of India's horticultural commodities.
2. To estimate export elasticity's for Indian fruits, vegetables and flowers.
3. To identify major destinations and their share in India's total horticultural exports.

4. To suggests polices and strategies for boosting Indian horticultural exports and foreign earnings.

2. METHODOLOGY

This is basically exports market research study. India's major export horticultural commodities were selected. It includes fruits, nuts, vegetables and flowers. Study Period is 1990-91 to 2012-13. Data on quantity, values, and prices of exports, international prices and destinations of fruits, vegetables and flowers were collected. India is exporting these commodities to maximum 130 countries. Data sources are Agricultural Produce Export Development Authority (APEDA) [26], Directorate General of Commercial Intelligence (DGCIS) [27], National Horticultural Board (NHB) [1], FAO Stat [28], Centre for monitoring on Indian economy (CMIE) [29], International Trade Statistics Year Book [30], Planning commission reports [31], National Bank for Agricultural and Rural Development (NABARD) [32], EXIM Bank and export companies [33]. 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 which accounted major share of exports and rest as other countries. Finally top 3 countries which accounted major share of India's exports for each commodity are identified. The compound growth rates, price elasticity's, instability index of exports were estimated using the following formulae's.

2.1 Growth Rate Formulae [34]

The compound growth rate (r) was calculated by fitting.

Exponential function to the variables of interest viz., exports, prices for the period 1990-91to 2012-13.

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

Assuming multiplicative error term in the equation1, model may be linearized by logarithmic transformation

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

Where, A (=lnA₀) and B (=ln (1+r)) are the parameters to be estimated by ordinary least square regression, t = timetrend in year, r = exp (B) -1

2.2 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 $(\Delta Q/Q_{ave}) / (\Delta P/P_{ave})$.

2.3 Instability Index Formulae

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

3. RESULTS AND DISCUSSION

3.1 Exports and International Prices 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. 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. Singh and S. K. Singla [5] found from their study (1992 to 2006) that exports from India have experienced instability primarily in the developing countries. 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 2000-12, 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 of fruits, vegetables and flowers are positive except mushrooms and walnut.

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 for all commodities price growth rates in the export destinations were positive and high. It was found that 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.

3.2 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 export elasticity's of India's fruits, vegetables and flowers during 1990-2012 (%) are shown in Table 2. The elasticity's 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 among fruits banana has high export elasticity (4.38) and among vegetables Green Chillies have high (3.98). The study found that all elasticity's of fruits, vegetables and flowers are elastic except walnut and mushrooms where their elasticity's are inelastic.

Table 1. The export growth rates (qty) and international price growth rates of India's fruits, vegetables and flowers during 1990-2012 (%)

		Export data 1990 to 2012 qty ,value and price growth rata									
Crop	Item	1990-1991	2000-2001	2011-2012	1990-91 to 2000-01		2000-01 to 2011-12		1990-91 to 2011-12		
					Growth rate	CV	Growth rate	CV	Growth rate	CV	
Mango	Qty in MT	19378.3	37109.7	63441.3	7.5	30.60	5.0	26.12	5.8	44.08	
	Value in Rs Lakh	3121.6	6860.7	20974.3	9.1	32.72	10.7	43.66	9.5	68.24	
	Price/ Kg	16.1	18.5	33.1	1.5	8.11	5.4	35.60	3.5	34.93	
Grapes	Qty in MT	6406.8	20647.6	108584.6	13.9	35.39	16.3	65.56	14.4	97.06	
	Value in Rs Lakh	1007.9	8297.6	60288.2	26.4	50.50	19.8	93.05	21.5	133.97	
	Price / Kg	15.7	40.2	55.5	11.0	31.66	3.0	26.04	6.2	37.26	
Banana	Qty in MT	9.7	22.2	418.2	9.6	210.92	30.6	111.16	19.6	166.15	
	Value in Rs Lakh	0.5	8.6	29.5	35.9	164.36	11.9	106.60	21.0	172.72	
	Price / Kg	5.5	38.5	7.0	24.0	88.21	-14.3	82.00	1.1	83.54	
Pomegranate	Qty in MT	780.0	4455.5	30162.3	21.4	45.85	19.0	62.47	19.0	108.30	
	Value in Rs Lakh	96.7	991.6	14727.8	29.5	57.77	27.8	82.57	27.0	144.30	
	Price/ Kg	12.4	22.3	48.8	6.7	23.25	7.4	41.56	6.7	58.02	
Walnut	Qty in MT	848.4	597.1	143.6	-3.8	41.62	-12.2	63.81	-8.1	58.00	
	Value in Rs Lakh	366.2	770.8	233.7	8.6	35.33	-10.3	100.98	-2.1	71.84	
	Price/kg	43.2	129.1	162.8	12.9	30.12	2.1	41.97	6.5	36.93	
Onion	Qty in MT	241591.6	342856.7	1309700.3	4.0	20.43	13.0	43.21	8.4	69.08	
	Value in Rs Lakh	9218.1	27582.2	172299.8	13.0	26.15	18.1	61.25	15.0	99.89	
	Price/Kg	3.8	8.0	13.2	8.6	25.91	4.6	29.53	6.1	39.83	
Potato	Qty in MT	2770.1	11067.7	36538.8	16.6	249.67	11.5	131.12	13.1	161.49	
	Value in Rs Lakh	101.7	701.8	3846.9	23.9	174.10	16.7	114.45	18.9	162.37	
	Prices/Kg	3.7	6.3	10.5	6.3	75.90	4.7	51.21	5.1	65.90	
green chilly	Qty in MT	51.1	3212.5	141.5	58.4	140.75	-24.7	93.00	5.0	125.14	
	Value in Rs Lakh	6.6	594.8	21.8	64.9	159.32	-26.0	99.76	5.8	144.10	
	Price/Kg	12.9	18.5	15.4	4.1	22.82	-1.7	18.16	0.8	26.94	
Gherkins	Qty in MT	952.5	26142.5	73797.5	44.5	64.37	9.9	41.88	23.0	70.54	
	Value in Rs Lakh	121.6	5885.5	20316.2	53.9	71.29	11.9	52.30	27.6	82.55	
	Price/ Kg	12.8	22.5	27.5	6.5	16.52	1.8	20.20	3.7	22.77	
Rose	Qty in MT	0.0	261.6	597.0		94.35	7.8	95.72		151.10	
	Value in Rs Lakh	6.3	18.8	805.3	13.0	85.89	40.7	129.46	26.0	171.64	
	Prices / Kg	0.0	7.2	134.9		46.92	30.6	108.64		122.51	
Mushroom	Qty in MT	0.0	7598.6	177.4			-28.9				
	Value in Rs Lakh	0.0	3919.5	163.1			-25.1				
	Prices / Kg	0.0	51.6	91.9			5.4				

Source DGCIS Export Data 1990-2013 (Qty in MT / Value in Rs Lakh)

3.3 Export Destinations

India's fruits, vegetables and flowers export destinations and their share in the world exports during 1990-91 to 2011-12 are shown in Table 3 - 13. 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%). The major destinations for India's rose are Netherland (26.34%), Ethiopia (21.03%), UAE (9.43%).

The study found that India is the fruit and vegetable basket of the world. Over 65-90% fruits and 50 to 65% vegetables of India's exports in fresh products go to West Asia and East European markets. Exports of Gherkins (53%), Mushrooms (94%) going to the USA, United Kingdom, France, Spain, Israel and Russia. The major destinations for India's Rose are Netherland, Ethiopia and UAE. The major destinations for Wal nut is Nepal, UK and France (40%).

Table 2. Export elasticities of India's fruits, vegetables and flowers during 1990-2012 (%)

Group	Commodity	Elasticity (%)			
		1991 to 2001	2001 to 2011	1990-91 to 2011-12	
Fruits	Banana	0.66	-0.21	4.58	elastic
	Mango	3.71	0.94	1.35	elastic
	Pomegranate	1.86	1.57	1.31	elastic
	Grapes	1.13	2.93	1.31	elastic
Nut	Walnut	-0.63	-15.26	-6.68	inelastic
Vegetables	Onion	0.56	1.90	1.15	elastic
	Potato	1.78	1.75	1.42	elastic
	Green chilly	3.26	107.31	3.98	elastic
	Gherkins	2.22	3.54	1.84	elastic
	Mushroom	0.00	-95.34	0.00	inelastic
Flowers	Rose	0.00	0.59	0.00	elastic

Table 3. India's Mango export destinations in the world during 1990-2012

Country	Mango export data					
	Total qty	%of Total qty	Total value	% Total of value	Average price/unit	% of total
United Arab Emirates	318789.57	37.20	96118.15	48.27	0.30	8.58
Bangladesh	279851.21	32.66	27777.55	13.95	0.10	2.82
Saudi Arabia	81079.72	9.46	17711.74	8.89	0.22	6.21
United Kingdom	34745.25	4.05	17197.42	8.64	0.49	14.08
Kuwait	22365.61	2.61	7626.85	3.83	0.34	9.70
Bahrain	19884.45	2.32	4727.73	2.37	0.24	6.76
Qatar	12587.99	1.47	3638.8	1.83	0.29	8.22
United States	6075.84	0.71	2941.27	1.48	0.48	13.77
Singapore	6117.75	0.71	2786.53	1.40	0.46	12.96
Netherland	6783.06	0.79	2428.4	1.22	0.36	10.18
Others (115 country)	68675.15	8.01	16178.89	8.12	0.24	6.70

Source DGCIS Export Data 1990-2013 (Qty in MT (metric tonne) / Value in Rs Lakh)

Table 4. India's Grape export destinations in the world during 1990-2012

Grapes export data						
Country	Total qty	%of Total qty	Total value	Total% of value	Average price/unit	Total %
Bangladesh	334670.12	29.02	49902.26	10.06	0.15	2.73
Netherland	210882.31	18.29	132952.27	26.81	0.63	11.53
United Kingdom	176457.04	15.30	94546.88	19.07	0.54	9.80
United Arab Emirates	161751.59	14.03	72493.96	14.62	0.45	8.20
Saudi Arabia	43395.39	3.76	20565.51	4.15	0.47	8.67
Germany	25173.16	2.18	9877.44	1.99	0.39	7.18
Russia	27956.88	2.42	21233.04	4.28	0.76	13.89
Belgium	19907.29	1.73	10682.2	2.15	0.54	9.81
Sri Lanka	18077.4	1.57	7246.22	1.46	0.40	7.33
Oman	6571.29	0.57	3775.59	0.76	0.57	10.51
Others (120 country)	128186.23	11.12	72581.39	14.64	0.57	10.36

Source DGCIS Export Data 1990-2013 (Qty in MT (metric tonne) / Value in Rs Lakh)

Table 5. India's Banana export destinations in the world during 1990-2012

Banana Export Data						
Country	Total Qty	%of Total Qty	Total Value	Total% of Value	Average Price/unit	Total %
Nepal	3814.43	78.28	254.88	55.23	0.07	2.84
United Arab Emirates	300.64	6.17	32.41	7.02	0.11	4.59
Maldives	181.85	3.73	13.52	2.93	0.07	3.17
Russia	145.88	2.99	31.44	6.81	0.22	9.17
Qatar	80.84	1.66	31	6.72	0.38	16.32
Saudi Arabia	44.82	0.92	19.36	4.20	0.43	18.39
United Kingdom	48.15	0.99	10.66	2.31	0.22	9.42
Kuwait	43.98	0.90	7.72	1.67	0.18	7.47
Oman	24.6	0.50	6.48	1.40	0.26	11.21
Bahrain	21.58	0.44	2.06	0.45	0.10	4.06
Others(13 country)	165.87	3.40	51.97	11.26	0.31	13.34

Source DGCIS Export Data 1990-2013 (Qty in MT (metric tonne) / Value in Rs Lakh)

Table 6. India's Pomegranate export destinations in the world during 1990-2012.

Pomegranate Export Data						
Country	Total Qty	% Total of Qty	Total value	Total% of value	Average Price/unit	Total %
United Arab Emirates	115912.12	48.52	39385.25	45.30	0.34	6.48
Bangladesh	30482.61	12.76	5714.86	6.57	0.19	3.58
Saudi Arabia	19816.85	8.30	5318.02	6.12	0.27	5.12
Netherland	16137.4	6.76	9781.59	11.25	0.61	11.56
Nepal	8758.76	3.67	1361.04	1.57	0.16	2.96
United Kingdom	8131.79	3.40	6756.32	7.77	0.83	15.85
Bahrain	5813.24	2.43	1535.67	1.77	0.26	5.04
Oman	3821.48	1.60	1661.08	1.91	0.43	8.29
Russia	3030.59	1.27	3274.24	3.77	1.08	20.61
Singapore	1561.34	0.65	990.94	1.14	0.63	12.11
Others (71 country)	25414.26	10.64	11167.48	12.84	0.44	8.38

Source DGCIS Export Data 1990-2013 (Qty in MT (metric tonne) / Value in Rs Lakh)

3.4 Exports Trends

The trends of quantity exported of fruits, vegetables, flowers are depicted in this section.

The time series data on fruits quantity exported is shown in Fig. 1. The export trends of Mango, Grapes, and Pomegranate up to 2004 were more or less stable. But 2008 onwards these crops exports trend were found increasing steady with

fluctuations. The export trend of banana was higher during 2003 to 2005 and the rest of the periods showed fluctuating trends.

The time series data on vegetables quantity exported is shown in Fig. 2. The trend of green chillies fluctuates up to 2000 but in 2001 and 2005 was maximum then continuously declining, and in 2012 regained. Similarly potato trend was maximum up to 2007 after 2008 continuously declining again in 2012 regained. The trend of gherkins was found increasing steady since 1997 to 2005 after that shoot up. The trend of onion

was found increasing steady up to 2000 after 2005 onwards shoot up.

The time series data on walnut quantity exported is shown in Fig. 3. Despite of fluctuating and increasing exports up to 2002 after 2003 trend was found decreasing steady.

The time series data on rose quantity exported is shown in Fig. 4. The rose exports trends up to 1998 were stable. The exports shot up in 1999 and then a decreasing trend with fluctuations was observed till 2011; later, the exports regained again in 2012.

Table 7. India's Walnut export destinations of in the world during 1990-2012.

Country	Walnut export data					
	Total qty	%of Total qty	Total value	Total% of value	Average price/unit	Total %
Nepal	1463.32	13.08	940.71	8.52	0.64	5.81
United Kingdom	1289.19	11.52	1137.94	10.30	0.88	7.98
Spain	1013.87	9.06	1545.02	13.99	1.52	13.77
France	1138.46	10.18	1113.19	10.08	0.98	8.84
Germany	831.21	7.43	907.79	8.22	1.09	9.87
Netherland	703.42	6.29	814.26	7.37	1.16	10.46
Egypt Arab Republic	551.52	4.93	810.03	7.34	1.47	13.27
Denmark	538.15	4.81	655.29	5.93	1.22	11.01
United Arab Emirates	368.48	3.29	192.22	1.74	0.52	4.71
Italy	497.13	4.44	321.18	2.91	0.65	5.84
others(56 country)	2791.64	24.96	2605.65	23.59	0.93	8.44

Source DGCIS Export Data 1990-2013 (Qty in MT (metric tonne) / Value in Rs Lakh)

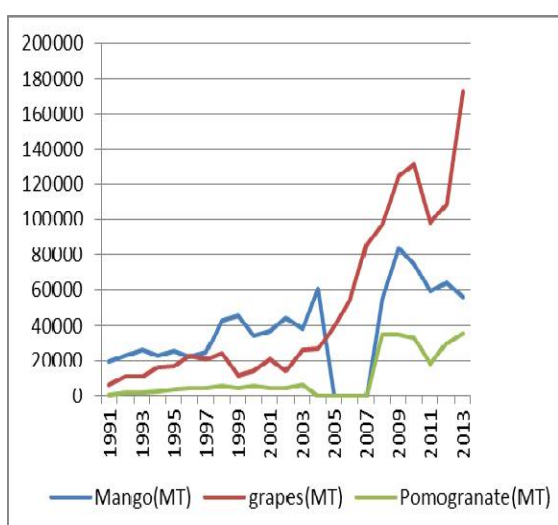


Fig. 1a. Trends of mango, grapes and pomegranate

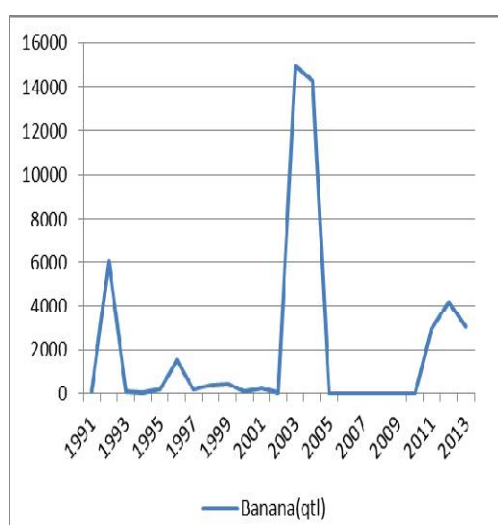


Fig. 1b. Trends of banana (Quintals)

Fig. 1(a&b). Trends of India's fruits exports during 1990-2013

Table 8. India's Potato export destinations in the world during 1990-2012

Potato export data						
Country	Total qty	%of total qty	Total value	Total% of value	Average price/unit	Total %
Saudi Arabia	1642.15	29.73	808.61	22.88	0.49	6.34
United Arab Emirates	659.23	11.93	310.99	8.80	0.47	6.08
Pakistan	696.5	12.61	44.94	1.27	0.06	0.83
Nepal	541.33	9.80	630.55	17.84	1.16	15.00
Oman	427.53	7.74	200.16	5.66	0.47	6.03
Bangladesh	373.97	6.77	831.95	23.54	2.22	28.65
Bahrain	363.05	6.57	154.21	4.36	0.42	5.47
Mauritius	138.82	2.51	69.48	1.97	0.50	6.45
United States	128.03	2.32	62.37	1.76	0.49	6.27
Kuwait	117.06	2.12	80.09	2.27	0.68	8.81
Others (30 country)	436.34	7.90	340.92	9.65	0.78	10.06

Source DGCIS Export Data 1990-2013 (Qty in MT (metric tonne) / Value in Rs Lakh)

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

Onion export data						
Country	Total qty	% of Total qty	Total value	Total% of value	Average price/unit	Total %
Bangladesh	4891655.03	29.77	499252.91	31.18	0.10	9.17
Malaysia	3555002.81	21.64	369301.32	23.06	0.10	9.33
United Arab Emirates	2616444.57	15.92	211878.42	13.23	0.08	7.28
Sri Lanka	1978603.86	12.04	175549.7	10.96	0.09	7.97
Pakistan	567947.65	3.46	61279.21	3.83	0.11	9.70
Singapore	604462.29	3.68	52048.1	3.25	0.09	7.74
Nepal	316817.47	1.93	24532.16	1.53	0.08	6.96
Kuwait	184043.72	1.12	16484.73	1.03	0.09	8.05
Indonesia	182180.16	1.11	29381.81	1.83	0.16	14.49
Oman	140434.12	0.85	15594.11	0.97	0.11	9.98
Others (105 country)	1402347.16	8.53	145743.54	9.10	0.10	9.34

Source DGCIS Export Data 1990-2013 (Qty in MT (metric tonne) / Value in Rs Lakh)

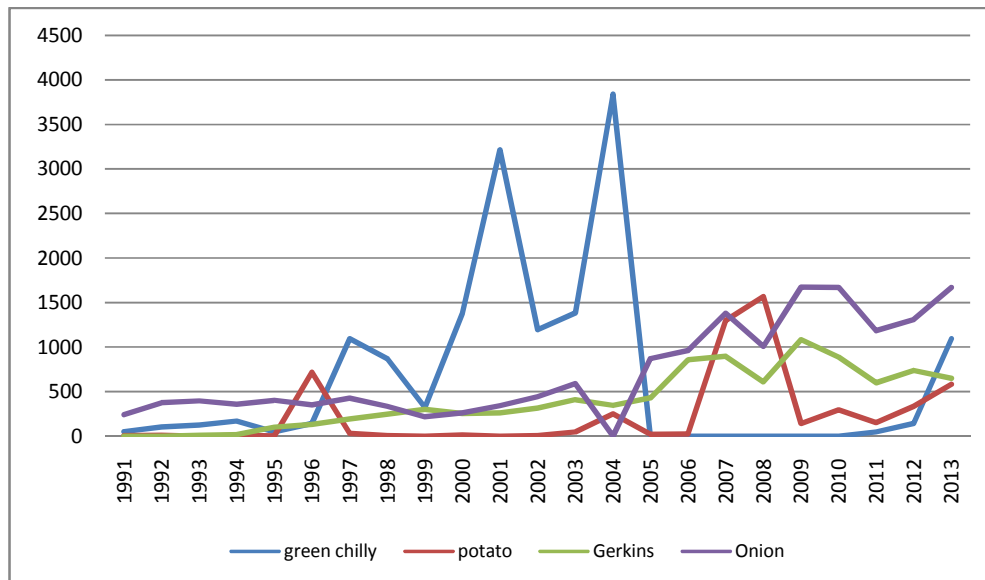


Fig. 2. Trends of India's vegetables exports during 1990-2013

Table 10. India's Green chillies export destinations in the world during 1990-2012

Green chilly export data						
Country	Total qty	%of Total qty	Total value	Total% of value	Average price/unit	Total %
United Kingdom	2477.85	16.30	615.27	21.34	0.25	12.30
Pakistan	2058.5	13.54	171.78	5.96	0.08	4.13
United Arab Emirates	1853.75	12.19	392.48	13.61	0.21	10.49
Saudi Arabia	1289.1	8.48	262.63	9.11	0.20	10.09
Nepal	930.98	6.12	105.44	3.66	0.11	5.61
United States	864.09	5.68	209.5	7.27	0.24	12.01
Canada	845.66	5.56	139.08	4.82	0.16	8.15
Bangladesh	396.3	2.61	31.2	1.08	0.08	3.90
Qatar	505.29	3.32	107.38	3.72	0.21	10.53
Sri Lanka	529.18	3.48	133.69	4.64	0.25	12.52
Others (39 country)	3453.44	22.71	714.5	24.78	0.21	10.25

Source DGCIS Export Data 1990-2013 (Qty in MT (metric tonne) / Value in Rs Lakh)

Table 11. India's Gherkin export destinations in the world during 1990-2012

Gherkins export data						
Country	Total Qty	%of Total Qty	Total Value	Total% of Value	Average Price/unit	Total %
United States	189277.21	20.32	43982.92	19.49	0.23	9.07
France	165348.55	17.75	47421.57	21.01	0.29	11.20
Spain	138585.3	14.88	31512.12	13.96	0.23	8.88
Russia	102857.93	11.04	21122.1	9.36	0.21	8.02
Belgium	93549.96	10.04	28906.82	12.81	0.31	12.07
Netherland	37383.74	4.01	7761.75	3.44	0.21	8.11
Australia	36285.77	3.90	6723.9	2.98	0.19	7.24
Canada	33193.16	3.56	7494.32	3.32	0.23	8.82
Italy	15340.43	1.65	4143.12	1.84	0.27	10.55
Estonia	13778.79	1.48	2525.3	1.12	0.18	7.16
Others (91 Country)	105726.73	11.35	24071.09	10.67	0.23	8.89

Source DGCIS Export Data 1990-2013 (Qty in MT (metric tonne) / Value in Rs Lakh)

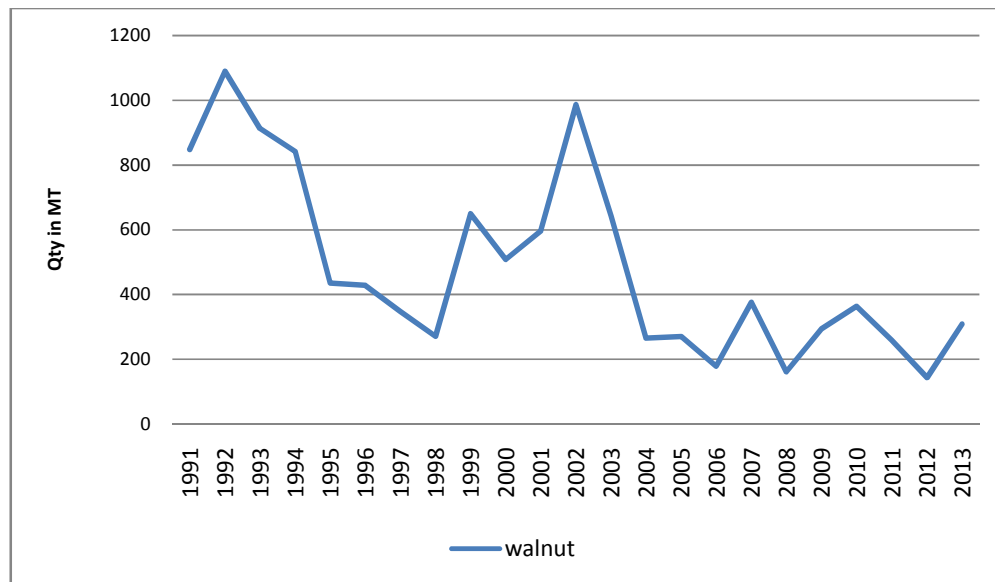
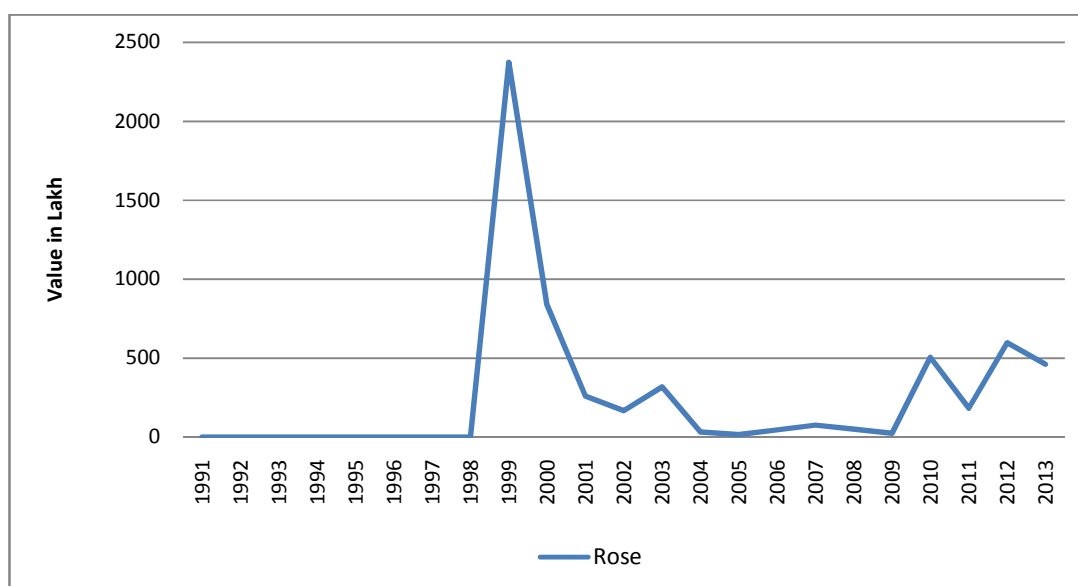


Fig. 3. Trends of India's walnuts exports during 1990-2013

Table 12. India's Mushrooms export destinations in the world during 1990-2012

Mushroom export data (2001 to 2013)						
Country	Total qty	%of total qty	Total value	Total% of value	Average price/unit	Total %
United States	38704.43	80.93	16777.63	83.38	0.43	10.42
Israel	6049.37	12.65	2173.82	10.80	0.36	8.64
Russia	606.37	1.27	215.39	1.07	0.36	8.54
Mexico	321.6	0.67	69.71	0.35	0.22	5.21
Netherland	294.63	0.62	85.61	0.43	0.29	6.99
France	160	0.33	86.39	0.43	0.54	12.98
Taiwan	140	0.29	27.78	0.14	0.20	4.77
Korea Republic	138.8	0.29	53.37	0.27	0.38	9.25
Canada	133.16	0.28	66.81	0.33	0.50	12.06
United Arab Emirates	83.22	0.17	38.7	0.19	0.47	11.18
Others (34 Country)	1153.18	2.41	476.9	2.37	0.41	9.94

Source DGCIS Export Data 1990-2013 (Qty in MT (metric tonne) / Value in Rs Lakh)

**Fig. 4. Trends of India's Rose exports during 1990-2011****Table 13. India's Rose export destinations in the world during 1990-2012**

Rose export data						
Country	Total qty	%of total qty	Total value	Total% of value	Average price/unit	Total %
Netherland	1509.5	25.34	172.96	2.93	0.11	1.6
Ethiopia	1252.5	21.03	4141.32	70.15	3.31	47.1
United Arab Emirates	561.5	9.43	672.12	11.39	1.20	17.1
Australia	456.8	7.67	40.23	0.68	0.09	1.3
Myanmar	300.0	5.04	7.55	0.13	0.03	0.4
Singapore	319.8	5.37	32.30	0.55	0.10	1.4
United States	219.6	3.69	157.28	2.66	0.72	10.2
Japan	170.9	2.87	102.21	1.73	0.60	8.5
United Kingdom	138.5	2.33	31.65	0.54	0.23	3.3
Italy	150.0	2.52	3.42	0.06	0.02	0.3
others (46 country)	877.85	14.74	542.25	9.19	0.62	8.8

Source DGCIS Export Data 1990-2013 (Qty in MT (metric tonne) / Value in Rs Lakh)

5. CONCLUSION

The study findings have important implications to be considered in designing policies and programs for boosting horticultural exports, foreign earnings, identifications of destinations and modern export supply chains developments. 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) ranges 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. Singh and S. K. Singla [5] found from their study (1992 to 2006) that exports from India have experienced instability primarily in the developing countries. During this period the price elasticity's of exports of fruits, vegetables, flowers except walnut and mushrooms are elastic. This implies that Indian exports of these commodities highly responsive to price changes in the international markets. Among fruits, the highest elasticity's 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. The study found that all the price growth rates of fruits, vegetables and flowers are positive and high. The study concludes that the all commodities quantity export growth rates more than price growth rates except walnut and mushrooms.

The major destinations which accounted 65 to 90% share for Indian fruits are Bangladesh, UAE, Pakistan, Malaysia, Sri Lanka, UK, Saudi Arabia, Nepal, Netherland and France. The major destinations for walnut are Nepal, UK and France (40%). The major share 50 to 65% of India's vegetables (potato, onion, green chillies) are exported to Saudi Arabia, UAE, Pakistan, Malaysia and UK.

The study found that India is the fruit and vegetable basket of the world. Over 65-90% fruits and 50 to 65% vegetables of India's exports in fresh products go to West Asia and East European markets. Exports of Gherkins (53%), Mushrooms (94%) going to the USA, United Kingdom, France, Spain, Israel and Russia. The major destinations for India's Rose are Netherland, Ethiopia and UAE and for walnut are Nepal, UK and France (40%). The trends of fruits exports 2008 onwards found increasing steady.

Vegetables such as green chillies and potato and walnut and rose were observed mixed trends. The trend of gherkins was found increasing steady from 1997 to 2005 but after that shoot up. The trend of onion was found increasing steady up to 2004 but 2005 onwards shoot up.

The study findings have important implications to be considered in designing agricultural policies and programs to boost exports and foreign earnings of horticultural commodities in Asia and East European markets and USA. The study guides exporters and importers for market and price signals of the horticultural commodities. India should adopt multispeed strategies for boosting horticultural exports and develop modern supply chains of exports. India needs to search new markets in top speed countries for horticulture exports.

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COMPETING INTERESTS

Author has declared that no competing interests exist.

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