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## Trade Competitiveness and Impact of Food Safety Regulations on Market Access of India's Horticultural Trade<sup>§</sup>

Said Idris, Alka Singh\* and K.V. Praveen

Division of Agricultural Economics, ICAR-Indian Agricultural Research Institute, New Delhi - 110 012

### Abstract

The paper has looked into the composition and direction of India's horticultural trade and the comparative advantage that India enjoys in selected markets with respect to its competitors. The importance of SPS provisions stipulated by niche market importers as barrier to India's trade, and the SPS compliance strategies adopted by the exporters are also dealt. It has been observed that Asian countries are the favourite export destinations for most of the Indian horticultural commodities, even though the unit price realized is less compared to that realized in the European countries, USA and Japan. The study has found that India has comparative advantage over China in the Asia market in fresh grapes, guava, and mango. In cashew, Tanzania and Vietnam have consistently enjoyed comparative advantage over India in the EU market, but not in the Asia market. Food safety standards stipulated by the USA and EU have had considerable impact on Indian horticultural exports as the country faces the highest number of rejections of consignments and notifications issued. Exports of spices, fresh and processed fruits, and vegetables are the most affected commodities due to non-compliance. The non-tariff barriers established by the importing countries combined with other factors like zero tolerance to insects and pests, and issues in certification, cause difficulties to the exporters. Rejection or additional checks at the entry points create considerable financial loss, delay in delivery to the client, loss of quality and reputation of Indian exports.

**Key words:** Horticultural trade, unit value realization, revealed comparative advantage, sanitary and phyto-sanitary measures, import detentions

**JEL Classification:** F10, F13, F14, Q17

### Introduction

Horticulture has emerged as one of the fastest growing sector within agriculture during the past two decades. The sector has not only triggered India's agricultural development but has also offered a wide range of choices to farmers for enhancing farm profitability and crop diversification. Though the sector

holds just 10 per cent of the gross cropped area, but contributes 23 per cent of value of output from agriculture (GoI, 2013). This could be attributed to the fact that a focused attention was given towards its development by enhancing resource allocations in recent years for strengthening infrastructure and knowledge-based technology support. This has resulted into area expansion and rise in productivity of horticultural crops which led to enhanced market arrivals and larger involvements of markets in handling horticultural trade. Over the past two decades, country has realized significant growth in export of various horticultural products (fresh and processed), which accounts for 12 per cent of total agricultural exports.

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\* Author for correspondence  
Email: [alkasingh@iari.res.in](mailto:alkasingh@iari.res.in)

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The decade of 1990s witnessed a significant change in the international rules governing national trade policies for agriculture. Since then, the market and regulatory context of agricultural trade has witnessed significant changes in ways that create obstacles to trade that are more obscure and have the potential to distort trade, especially for new entrants and putting new challenges and pressures on the existing suppliers (Peterson *et al.*, 2013). Technical measures such as sanitary and phytosanitary (SPS) regulations have assumed importance, especially for food and agricultural products due to the sensitive nature of issues such as food safety and the protection of plant and animal health. The World Trade Organization (WTO) Agreement on the Application of SPS Measures permits countries to adopt their own set of regulations provided they are based on a risk assessment. This is especially true in relation to supplying the fresh and processed horticultural products to markets of developed countries. As consumer awareness and concern for food safety and the ethical and environmental conditions under which food is produced and distributed is growing, these measures can consequently be detrimental to exports from developing countries (Henson *et al.*, 2000; World Bank, 2005).

There is a growing body of literature exploring impacts of SPS and other technical regulations on international trade patterns (Otsuki *et al.*, 2001a;b; Moenius, 2004; Wilson and Otsuki, 2003; Winchester *et al.*, 2012), and assessed trade losses borne by exporters when importing countries impose stricter regulations. These measures can prohibit trade by imposing an import ban or by prohibitively increasing production and marketing costs. They can also divert trade from one trading partner to another by laying down regulations that discriminate across potential supplies. In certain cases, stricter SPS measures are applied to imports than domestic supplies, for example, where higher risks are associated with supplies from other countries (Henson and Loader, 2001).

This paper looks into the recent trends in levels, composition and direction of horticultural trade quantifying India's comparative advantage in export of horticultural produce in selected markets with respect to its competitors. The paper also examines how various SPS provisions stipulated by niche market importers' of horticultural products act as barriers to

India's trade, and explores the compliance strategies adopted by the exporters.

## Data and Methodology

The study used data on India's exports of horticultural commodities, in terms of both quantity and value to major importing destinations for the period 1991-92 to 2013-14 collected from Agriculture and Processed Food Products Export Development Authority (APEDA), Ministry of Commerce and Industries, Government of India. Similar data for other commodities like spices and plantation crops, were compiled from the Spices Board, Cashew Export Promotion Council and Coconut Development Board. Country-wise and commodity-wise horticultural trade for major export markets for the period 2005 to 2012 were collected from Trade Map database developed by the International Trade Centre (ITC) and UNCTAD/WTO for estimation of revealed comparative advantage (RCA) indices. The revealed comparative advantage (RCA) index was estimated to measure trade competitiveness of major horticultural commodities against major competitors. RCA was introduced by Liesner (1958), redefined and popularized by Balassa (1965) to identify a country's weak and strong export sectors. The index measures normalized export shares, with respect to the exports of the same industry in a group of reference countries. The index is defined as per Equation (1)

$$RCA = \ln \left[ \frac{X_{iB}/X_B}{X_{iA}/X_A} \right] \quad \dots(1)$$

where,

$X_{iB}$  is India's exports of goods  $i$  to a particular country group,

$X_B$  is India's total merchandise export to the particular country group,

$X_{iA}$  is the rival country's exports of goods  $i$  to a particular country group, and

$X_A$  is the rival country's total merchandise export to the particular country group.

A positive value of RCA is an indication of country's comparative advantage in a particular commodity against the rival country in a selected market.

The study has used mainly two databases to analyze the impact of SPS measures prescribe by European countries and United States on India's horticultural exports. Data on product-wise import detentions along with reasons cited were accessed and compiled from United States Food and Drug Administration (US FDA) during April 2010-March 2011. Detailed information about SPS related notifications issued by the European Union on South-Asian agricultural exports and for India were compiled from EUs Rapid Alert System for Food and Feed (RASFF) database from 1988 to 2011. A feedback on sanitary and phyto-sanitary barriers and their compliance based on exporters' opinion were compiled from information compiled by APEDA, Ministry of Commerce and Industries, Government of India.

## Results and Discussion

### Changing Structure of India's Horticultural Exports

The analysis of export performance in horticultural commodities reveals that spices led all horticultural commodities, followed by cashew, onion, fresh vegetables and processed fruits and vegetables during 2013-14 (Table 1). The growth in export of processed fruits and vegetables export was seen consistently high during the 1990s and the 2000 decade, and has realized higher prices in the international market too. It consisted of dried & preserved vegetables (20%), mango pulp (20%), and other processed fruits & vegetables (fruit juices, squash, and preserved fruit slices, etc.) (60%). Among fresh fruits and vegetables, grapes and onion were the major products, and export of both these commodities grew impressively since the 1990s. The export value of fresh onion was the highest (₹ 31.7 billion) in fresh fruits and vegetable category, registering a growth of (export value) 19 per cent during 2001-13 compared to only 4 per cent during the 1990s. The neighbouring countries like Bangladesh, Sri Lanka, Pakistan, UAE and Malaysia have been the major importers of Indian onion. Next to onion was export of fresh grapes which grew from ₹ 0.20 billion in 1991-92 to ₹ 16.7 billion in 2013-14.

Although India's share in the export market of flowers is still insignificant, it has registered an increase from ₹ 0.15 billion in 1991-92 to ₹ 4.6 billion in 2013-

**Table 1. India's size and composition of horticultural exports**

(Value in billion ₹)		
Commodity	1991-92	2013-14
Fresh mango	0.4 (2.8)	2.9 (0.9)
Fresh grapes	0.2 (1.5)	16.7 (5.0)
Fresh onion	1.5 (11.7)	31.7 (9.6)
Other fresh fruits	0.3 (2.2)	10.2 (3.1)
Other fresh vegetables	0.3 (2.0)	22.9 (6.9)
Floriculture	0.1 (1.2)	4.6 (1.4)
Fruits and vegetable seeds	0.2 (1.3)	4.1 (1.2)
Dried and preserved vegetables	0.4 (2.8)	7.4 (2.2)
Mango pulp	0.3 (2.6)	7.7 (2.3)
Other processed fruits and vegetables	0.2 (1.7)	22.7 (6.9)
Cashew	4.4 (34.6)	51.0 (15.4)
Coconut	0.7 (5.8)	11.6 (3.5)
Spices	3.8 (29.9)	137.4 (41.5)
Total horticultural crops	12.8 (100)	330.7 (100)

*Notes:* Figures within the parenthesis denote share in total  
*Source:* Based on data from APEDA, Cashew Export Promotion Council, Spices Board and Coconut Development Board

14. The results showed an impressive growth in export of floriculture (31%) during the 1990s, but decreased drastically (8%) during the later decade. The major importing destinations were USA, Netherlands, Germany, UK and Japan. India is a leading producer, processor and exporter of cashew kernels in the world. The export earnings from cashew and allied products during 1991-92 were only ₹ 4.4 billion which increased to ₹ 51 billion by 2013-14. The share of cashew in total horticultural exports was 35 per cent in 1991-92, reduced to 15 per cent in 2013-14 (Tables 1 and 2).

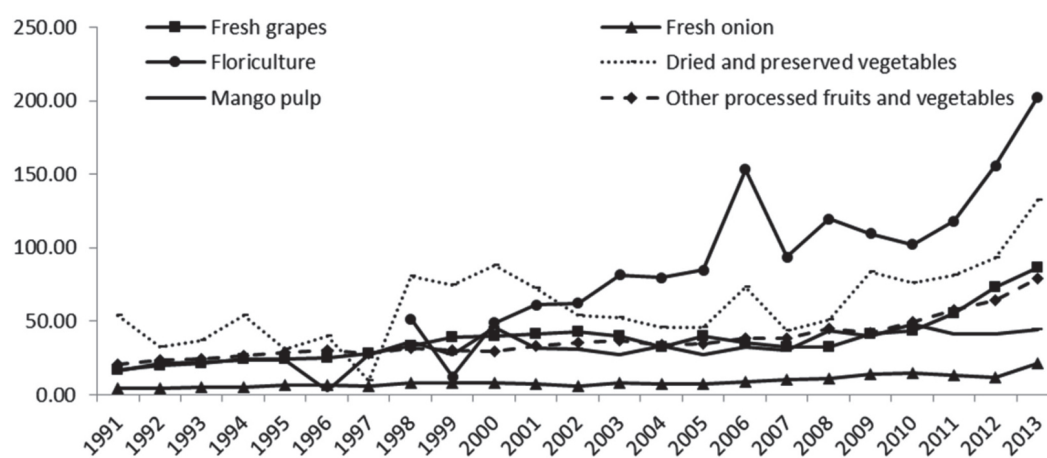
### Average Price Realization and Direction of India's Horticultural Exports

The trend in average unit price realized from export suggests that floriculture produce and dried and preserved vegetables fetched relatively much higher prices as compared to fresh fruits & vegetables during the study period. Fresh onion which constituted the bulk of fresh fruits and vegetable exports showed stagnancy in prices (Figure 1).

**Table 2. Growth in value of India's horticultural exports (CAGR%), 1991-92 to 2013-14**

Commodity	1991-92 to 2001-02	2001-02 to 2013-14	1991-92 to 2013-14
Fresh mango	8.6	11.07	9.8
Fresh grapes	14.2	27.0	19.1
Fresh onion	4.1	18.8	15.4
Floriculture	30.5	8.4	16.8
Fruits and vegetable seeds	19.3	16.6	12.8
Dried and preserved vegetables	20.0	17.1	13.8
Mango pulp	20.5	11.0	16.2
Other processed fruits and vegetables	20.5	23.3	20.7

Source: Authors' estimates based on APEDA database

**Figure 1. Trends in unit price realized from export of fresh and processed horticultural produce, 1991-2013**

In the case of grapes, Bangladesh is the major trading partner, but unit price realized was the lowest (Table 3). The country has experienced better unit price realization from countries like Russia, UK, Netherlands and UAE, etc. and therefore better export opportunities need to be explored in those countries. Similarly, the United Arab Emirate (UAE) and Bangladesh were the major export partners for fresh mango, but the country continues to receive lowest unit prices from these countries. Contrary to this, the country has better price realization by exporting to the UK and Kuwait. In the case of onion too, Bangladesh, Malaysia, Sri Lanka, UAE, and Indonesia are the major importers, but unit price realization is low. The results, in general, indicate that India's major trading partners for most of the horticultural produce are the neighbouring countries, like Asian countries, middle east, etc. Further, the unit price realization from horticultural exports to these countries have been found lower as compared to export to the European countries, USA and Japan.

### Competitiveness of Horticultural Commodities in Major World Markets

The RCA index, a measure of trade competitiveness, has shown that in the export of fresh grapes, Chile and South Africa had a significant comparative advantage over India in the EU market during 2005-2012, whereas India had comparative advantage over China in Asia Market (Table 4). Till recently, export of grapes from India was mostly confined to the neighbouring countries due to inadequate pre-cooling facilities and consciousness about quality as well as pesticide residues by countries like UK, USA and Germany. Adequate measures are now being taken to ensure pesticide residual limits and other good agricultural practices in grapes cultivation. In the case of onion and shallots, fresh or chilled, India could enjoy comparative advantage over Turkey only in the GCC (Gulf Council Corporation) market during the entire study period.



**Table 3. Direction and price realization of major horticultural exports of India**

Commodity	Country 1	Country 2	Country 3	Country 4	Country 5
<b>Fresh grapes</b>	Bangladesh	Netherlands	UAE	UK	Russia
% share in export	41	19	7	10	2
Unit price realization (₹ /kg)	14	69	50	73	95
<b>Fresh Mango</b>	UAE	Bangladesh	UK	Saudi Arabia	Kuwait
% share in export	43	39	5	3	1
Unit price realization (₹ /kg)	41	8	53	39	68
<b>Fresh onion</b>	Bangladesh	Malaysia	UAE	Sri Lanka	Indonesia
% share in export	33	23	11	10	4
Unit price realization (₹ /kg)	15	17	13	15	21
<b>Floriculture</b>	US	Germany	UK	Netherlands	Japan
% share in export	26	15	15	11	2
Unit price realization (₹ /kg)	78	97	82	144	193

Source: Authors' estimates based on APEDA data base

**Table 4. India's revealed comparative advantage indices of horticultural commodities with respect to its competitors in different markets, 2005-2012**

Export destination	2005	2006	2007	2008	2009	2010	2011	2012
<b>Fresh grapes (EU 27)</b>								
Chile	-1.16	-0.94	-1.06	-1.09	-1.33	-1.10	-1.50	-1.23
Israel	0.07	0.14	0.02	0.38	0.17	0.33	0.43	0.38
South Africa	-1.05	-0.89	-1.00	-0.84	-1.25	-1.01	-1.34	-1.09
<b>Fresh grapes (Asia)</b>								
Australia	-0.60	-0.58	-0.44	-0.28	-0.62	-0.18	-0.17	-0.13
China	1.17	0.87	0.78	0.73	0.34	0.31	0.14	0.14
South Africa	-0.91	-0.86	-0.87	-0.68	-0.96	-1.07	-1.05	-1.01
USA	-0.60	-0.43	-0.31	-0.29	-0.37	-0.41	-0.47	-0.33
<b>Onions and shallots, fresh or chilled (GCC)</b>								
Egypt	-	-	-	-0.84	-1.29	-1.41	-1.25	-1.30
Iran	-	-	-	0.39	-0.23	-0.25	0.20	-0.51
Turkey	-	-	-	0.89	1.46	1.62	2.02	2.17

Source: Authors' estimates

In the export of cut flowers and flowers buds for bouquets, fresh or dried, the country has depicted comparative advantage over Italy during the study period (Table 5). However, Netherlands, Colombia and Israel had significant comparative advantage over India in the EU market. India lost comparative advantage over China in the cut flowers for bouquets, fresh or dried, during the period 2009-2012 in the Asian market. In the US market, Colombia

has exhibited consistently higher comparative advantage over its main competitors like India, Netherlands and Israel. India has shown comparative advantage only over Israel during the study period in the US market, except for two years, viz. 2010 and 2012. Although Indian export of fresh cut flowers has increased in recent years, the volume as well as share in international trade is negligible compared to its competitors.

**Table 5. India's revealed comparative advantage indices of horticultural commodities with respect to its competitors in different markets, 2005 to 2012**

Export destination	2005	2006	2007	2008	2009	2010	2011	2012
<b>Cut flowers and flowers buds for bouquets, fresh or dried (EU 27)</b>								
Colombia	-1.75	-1.77	-1.72	-1.87	-1.83	-1.91	-1.65	-1.59
Israel	-0.99	-1.08	-1.06	-1.03	-1.36	-1.44	-1.14	-1.10
Italy	0.30	0.22	0.24	0.06	0.04	0.03	0.05	0.08
Netherlands	-1.27	-1.36	-1.36	-1.44	-1.50	-1.42	-1.57	-1.47
<b>Cut flowers and flowers buds for bouquets, fresh or dried (Asia)</b>								
China	0.31	0.88	1.13	0.09	-0.15	-0.15	-0.29	-0.27
Colombia	-1.68	-1.44	-1.27	-2.31	-2.27	-2.34	-2.44	-2.26
Netherlands	-0.67	-0.43	-0.16	-1.18	-1.24	-1.32	-1.46	-1.45
<b>Cut flowers and flowers buds for bouquets, fresh or dried (USA)</b>								
Colombia	-2.50	-2.67	-2.55	-2.62	-2.54	-2.60	-2.30	-2.43
Israel	0.13	0.002	0.06	0.01	0.01	-0.15	0.04	-0.02
Netherlands	-1.33	-1.46	-1.26	-1.38	-1.30	-1.32	-1.22	-1.24

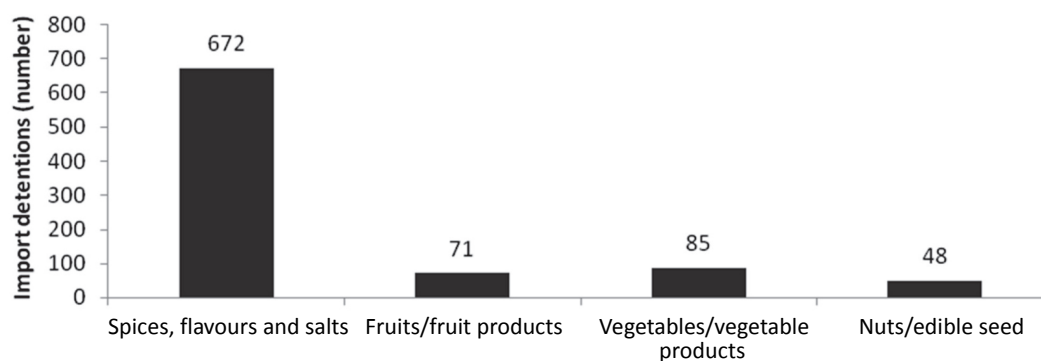
Source: Authors' estimates

### Sanitary and Phyto-Sanitary Issues Impacting Horticultural Exports

The SPS measures adopted by different developed countries can affect the volume and pattern of trade by increasing the costs of imports or prohibiting entirely. The number of detentions made by the United States Food and Drug Administration (USFDA) of select Indian horticultural products exported to the US market during April 2010–May 2011 shows that spices, vegetable products, nuts, and edible seeds faced the maximum rejections by US government during April 2010 to March 2011 (Figure 2). The presence of pesticides, salmonella, filth and labelling were found to be the major causes of rejections. Further, these factors have led to a decrease in the confidence of the

importers. In order to improve this situation, the exports must strictly follow the importing country's standards related to MRLs, other sanitary and technical requirements.

Among fruits, tamarind products (whole and concentrated) consignments faced maximum rejections by the US FDA on account of misbranding and containing filth, followed by canned fruits and other fruits (fresh or dried) during April 2010 to March 2011 (Table 6). Indian vegetables and vegetable products consignments were also rejected because of filth, pesticide residues, technical parameters like incorrect labelling such as not disclosing the process of manufacturing, etc. The consignments of canned and dried vegetables were also refused mostly in vegetable



**Figure 2. Number of US FDA import detentions for various horticultural products of India, April 2010- March 2011**

**Table 6. Number of US FDA import detentions of Indian fruits and fruit products and vegetables and vegetable products exports, April 2010 to March 2011**

Product	No. of refusals	Reason
<b>Fruit and fruit products</b>		
Tamarind (whole, concentrate)	25	Misbranding, Filth
Pickles	8	Misbranding, pesticide, Adulteration
Fruit paste	6	Filth
Canned fruits	12	Filth
Other fruits—fresh or dried	11	Salmonella, Filth, Misbranding
<b>Vegetable and vegetable products</b>		
Processed vegetables	9	Filth, Misbranding, Adulteration
Vegetables (frozen and fresh)	9	Pesticide, filth
Dried vegetables	34	Misbranding, Adulteration, Pesticide
Canned vegetables	35	Misbranding, Adulteration, Pesticide

Source: Compiled from US FDA Database

category on account of pesticide residues, adulteration and misbranding.

Table 7 gives a detailed account of targeted consignments of the South-Asian countries as a group by the European Union (EU) for the period 1988 to 2011 through the Rapid Alert System for Food and Feed (RASFF). The RASFF provides information on the notifications received by a particular country and also classifies them according to risk involved. Out of a total of 1048 notifications issued by the EU against all South Asian countries, 856 were notified against India during the period. The consignments which were affected included herbs and spices (58%), nuts, nut products and seeds (28%) and fruits and vegetables (16%).

#### **Exporters' Feedback on Sanitary and Phyto-sanitary Barriers Faced by Indian Horticultural Exports**

The foregoing discussion clearly indicates the considerable impact of food safety standards stipulated by the USA and EU on India's horticultural exports. This further suggests that SPS measures are potentially a significant barrier to the country's exports of agricultural and food products. The cost of rejection at the border is considerable, including loss of product value, transport and other export costs, and product re-export or destruction. Exporters face problems in meeting these multi-layered specifications as this

requires more sophisticated monitoring and testing, and therefore more costly procedures are required. The compliance strategies followed by exporters based on their feedback revealed that Japan has established strong non-tariff barriers with regard to market access on flowers. Plants quarantine procedures and zero tolerance for the insects and pests led to re-fumigation of consignments even when the fumigation was already been done by the exporters.

In the case of mango exports to US market, the market access demands cumbersome procedure, including a number of agreements and protocols, cost of certification, etc. Also, the US has permitted market access for Indian mangoes and litchis with cold treatment process. Similarly, the US has allowed market access for Indian litchis with cold treatment process as a quarantine measure. The US does not allow SO<sub>2</sub> fumigation as a post-harvest treatment in litchis. The exporters opined that SO<sub>2</sub> fumigation should be allowed as a post-harvest treatment, as it will increase shelf-life of litchi. A suitable solution needs to be found to overcome this unnecessary requirement. Further, The US does not accept group certification for organic products, mentioning that it involves inspection of the grower groups on a sample basis. It insists that there should be Internal Control System (ICS) in a growers group and each farmer should be inspected. Exporters' opined that this approach is not feasible, as in most cases area is too small and the number of farmers in a group exceed 1000.



**Table 7. Number of notifications issued by EU related to horticultural exports**

Crop	EU standard notified (South Asian countries)	% share	EU standards notified (India)	% share
Herbs and spices	605	58	499	58
Nuts, nut products and seeds	285	27	241	28
Fruits and vegetables	158	16	116	14
Total	1048		856	

Source: Adapted from Kallummal *et al.* (2013)

Different MRLs by the EU member countries for pesticides, drugs and other containments are also viewed as hindrance for exports. Similarly, most farms exporting floricultural products in India, have a very stringent pest control management system operational which adheres to International standards. A majority of farms have adopted Good Agricultural Practices (GAP). Despite high quality procedures prevalent on the exporting farms and very stringent phyto-sanitary inspection procedures, Indian floricultural produce is being subject to 50 per cent checks at entry points in the Netherlands. Exporters opined that this is a time-consuming process and results in unwanted delays in clearances, processing and delivery of the consignments to the end clients. Such delays cause loss of quality and reputation.

### Conclusions and Policy Implications

The commodity-wise analysis has shown that India's major importing partners for most of the horticultural produce are the neighbouring countries, like Asian and middle east countries. The unit price realization from horticultural exports to these countries has been found much lower as compared to the European countries, USA and Japan.

The empirical findings on India's comparative advantage in export of horticultural commodities to selected markets reveal that for fresh grapes, countries such as Australia, South Africa and USA have had higher competitive advantage over India in the Asia market. In the EU market, Chile and South Africa consistently enjoyed higher comparative advantage over India. In the case of onion exports too, India does not enjoy comparative advantage over its main competitor Egypt in the GCC market, but has depicted higher edge over Turkey and Iran in recent periods. In the case of flower exports, Netherlands, Colombia and

Israel have significant comparative advantage over India in the EU market. India has lost comparative advantage over China in the export of cut flowers for bouquets, fresh or dried, during the recent periods in the Asian market.

The results have indicated adverse impact of SPS standards stipulated by the USA and EU on India's horticultural export, as shown by higher number of rejections of consignments and notifications issued by the US and EU markets, respectively, mainly on account of having filth, pesticide residues, microbial contamination and non-compliance of other mandatory technical parameters. These results have been further substantiated by the exporters' views too who face problems in meeting multi-layered specifications and standards. This requires more sophisticated monitoring and testing, and therefore higher investments are required. There is a need of infrastructure development for testing and certification in terms of international standards.

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