Horticulture trade has been gaining importance in the developing countries for over a decade now. However, although the contribution of fruit and vegetable exports in total agricultural exports have been higher in case of developing countries as compared to that of the developed, yet the trend analysis of this share within developing countries has not been able to show much increase\(^1\). Developing countries have not been able to make it beyond 4% of the world horticultural trade contributed mainly by Turkey, Chile and Ecuador. Also these countries do not figure as major exporters in the international market both for fruits as well as vegetables.

The global trade in fruits as well as vegetables is dominated by the developed economies with USA capturing largest share in the total world exports followed by European markets including Spain, Netherlands and Italy. Italy has emerged as major exporter of grapes and cherries, Netherlands for grapes, mangoes, pineapple and papaya, Spain for oranges and Belgium for pineapple. USA has topped the list of major exporter of Grapes, Oranges, Pineapple, Cherries and Papaya. The banana trade is mainly dominated by Columbia, Costa Rica, Cote d'Ivore, Ecuador and Panama. Similar to fruits, Spain and Netherlands dominates the world vegetable exports ranking amongst top major suppliers for cauliflower, chilies, cucumber, lemons, onion, potato and tomatoes. USA figures as major suppliers for cauliflower, chilies, onion and tomatoes.

India is second largest producer of fruits and vegetables with the share of 10% just after China (34%) followed by Latin American and Caribbean (11 %). Horticultural sector occupies about 8% of India’s gross cropped area and account for 30% of agricultural gross (GDP). Horticulture production has increased by about 3 percent per annum. India produces about 6 percent of the world’s fruit and 11 percent of its vegetables. It is the world’s largest producer of mangoes, bananas, peas, and the second-largest producer of broad range of vegetables including cabbage, ginger and okra. [NHB Annual report 2010]

This high production potential should have resulted into making India as one of the largest exporters of the horticultural products in the global market considering the fact that the

\(^1\) In 1980-81, horticultural products accounted for 10.7 per cent of developing country food trade. By 2000-01 horticulture’s share of developing country agricultural trade had risen to 12.5 per cent. This further witnessed a meager increase to 13.22 percent by the year 2010.
consumption levels of fruits and vegetables in most of the developed countries have been witnessing positive growth since last decade\textsuperscript{2} leading them towards being the topmost importers of most of the fruits and vegetables exported by India\textsuperscript{3}. However, horticulture exports from India are not able to find place in these developed country markets which are the global importers except for minor share\textsuperscript{4}.

The concentration of Indian horticulture exports is majorly in the developing country markets. Amongst developing countries also major markets have been neighboring destinations wherein the bulk of Indian produce entering these markets is targeted at migrant low end worker community.

These neighboring countries include Bangladesh, Middle East and Saudi Arabia. Nepal receives majority of India’s exports of cauliflower, potatoes, banana, citrus fruits other than orange and lemon. UAE imports more than 60% of India’s exports of papaya, pineapple, sapota, lemon and pumpkins. Other major exporting countries for India for fresh fruits and vegetables are Malaysia, Singapore and Saudi Arabia.

It is because of this reason that despite experiencing fairly strong growth in production, India’s share in global horticultural trade was a mere 1.07 and 1.3 percent in case of fruits and vegetable respectively in 2010 and is considered minor player in the international market. Further, although India exports a wide variety of horticultural products, only a handful of commodities or products account for the bulk of this trade. Also the unit value realization of Indian FFV are far below than the than that of many competing countries for instance Pakistan, Ecuador and China. This indicates the challenges of international competitiveness in terms of tariff as well as various types of non-tariff measures.

\textsuperscript{2} In the United States, fruit and vegetables as a group represent the largest category of per capita food consumption. Similarly, EU consumption is larger than EU production and imports are therefore necessary. Italy and Spain are the largest consumers, together already accounting for one-third of the EU market. Germany, France and the UK also have large markets (together 30% of EU consumption). Germany and the UK have high levels of consumption and limited domestic production and therefore rely heavily on imports. Japan also has stable but high levels of consumption of fruits and vegetables.

\textsuperscript{3} USA has been rated as top most importers of certain FFV in which India has immense production potential including banana, grape, onions and tomatoes. Similar is the case with many European countries including Belgium, Germany, Netherlands and UK for most of these FFV.

\textsuperscript{4} India’s share of developed country in total fruit exports from India declined from 60.42% in 2006 to 58.58% by the end of 2010. The United States imports FFV largely from Latin America. A large share of European imports comes from Africa. Amongst developing countries, China has emerged as a major supplier of horticulture to Japan with its market share doubling over last five years.
The European Union, Japan, and the United States use, in varying degrees, similar protection tools: low but highly dispersed ad valorem tariffs, specific duties, seasonal tariffs, tariff escalation, and preferential access along with tariff-rate quotas. However, average applied most-favored-nation (MFN) tariffs have lowered in all countries of the Quad—Canada, the European Union, Japan, and the United States. The horticulture export products hence are not facing high tariff barriers in the developed markets as against in the developing country markets any more.

But as tariffs have been lowered, demands for protectionism have induced various kinds of NTMs such as import quotas, voluntary export restraint, customs procedures, restrictive state trading interventions, rules of origin and domestic content requirement schemes etc. In case of the agro and processed food exports, these NTMs are mainly in the form of stringent food safety regulations in the importing markets of the developed countries. Trade in these products is governed by a growing array of standards related to the products themselves and to the processes by which they are produced and handled.

Under WTO framework, trade flows in this area is provided by the Agreement on Sanitary and Phytosanitary measures. The SPS Agreement establishes a multilateral mechanism to protect human, animal, and plant health in World Trade Organization (WTO) member countries. It covers basic rights and obligations; harmonization; equivalency; risk assessments; pest- or disease-free areas; transparency; control, inspection, and approval procedures; technical assistance; special and differential treatment; consultations and dispute settlement; administration; and implementation.

Despite WTO SPS agreement working towards managing the trade of safe food across borders, certain implementation issues exist in the agreement due to which although SPS standards and regulations in themselves may not admit to be a trade barrier yet their adoption in practice can be used as a trade barrier in the importing countries.

This research study has therefore tried to estimate the impact of these food safety regulations on the trade patterns, volumes and profits of Indian fruits and vegetable exporters. Although India produces and exports a broad range and variety of fruits and vegetable, it was not possible for this study to analyze all of them. Hence fruits and vegetables depicting high growth rates from India for over a decade (1995-2010) and high Revealed Comparative advantages (RCA) values for last five years were selected since high
growth rates and RCA values were indicative of export potential and significance for India. Fruits shortlisted in this category were, mango, papaya, grapes, banana, oranges and pineapple and vegetables shortlisted were onion, potato, tomatoes, garlic, gherkins, okra and curry leaves. Thereafter the trade flows of these identified commodities in major export markets were checked and the further short listing of these FFV were done on the basis of their declining trends and Trade Intensity Index (TII) values in those markets.

The methodology was therefore build with an assumption that for tariff lines in which India had witnessed high growth rate during last decade and also carry high comparative advantage reflected through rising RCA values, India should have emerged as either major exporter or have a reasonable presence in the major importing countries.

Any violation of this trend had encouraged the researcher to look into the possibilities of various reasons hampering this growth. Considering the fact that the tariff levels are coming down as a result of WTO AoA negotiations, it therefore strengthens the possibility of the presence of non-tariff measures which might have been responsible for this violation. Hence all those tariff lines where this combination (rising RCA and declining TII) is witnessed were shortlisted for further analysis.

This analysis of the shortlisted tariff lines was then substantiated by the details of the FFV listed under NTM database of Ministry of Commerce and industries, Government of India. Import detentions details from respective country websites including USFDA and RASFF notifications in USA and EU respectively, MAFF details from Japan and Ministry of health database from other developing countries. The short listing has also taken care of the frequency of dispute settlement cases for Indian fruits and vegetables wherein India has been listed as complaint. The final list of fruits and vegetables those emerged out of this analysis used to develop product and issue specific case studies were mangoes, grapes, banana, pomegranate and oranges within fruits and okra, curry leaves, tomatoes and gherkins amongst vegetables.

However it was found appropriate to assume that there could be many other factors apart from SPS regulations which could have been responsible towards the lost presence of Indian FFV exports in the international market. An in-depth primary survey was therefore conducted to understand all the possible issues which could hamper exports of FFV from
These numerous problems stated by exporters were broadly clubbed together into four major categories: (i) SPS requirements (ii) other technical requirements (iii) transport and other logistics cost (iv) tariffs (high import duties) and (v) other non-tariff barriers.

It was however seen that these factors were related with one another wherein inefficiencies in any one factor had an impact on the other factors leading to the final import rejection due to the combined effect. Hence in order to check the significance of SPS as a barrier, perception analysis was conducted across 93 exporters dealing in various fruits and vegetables exports across different states in the country. Survey respondents across various FFV producing zones were asked to rate the significance of each factor on a five-point rating scale from 'highest priority' (5) at one extreme to 'lowest priority' (1) at the other.

In order to determine whether the perception of exporters with regard to the factor influencing their ability to export to developed country's market is statistically significantly different or not, paired sample t test was used. Four paired t test were conducted between SPS requirement and other variables wherein a higher mean value for SPS as compared to other factors clearly indicated the relative importance of SPS as the most stringent barrier. This perceived importance of SPS as the most stringent and challenging trade barrier faced by the exporters was also proven through descriptive frequency analysis which stated that out of 93 exporters surveyed, almost 69% of the exporters considered SPS as the major issue hampering their exports by rating 4 (38%) and 5 (31%).

Once the link between the stringent SPS regulations across export markets and the poor performance of our FFV exports was established, this study contributed towards analyzing the trade impacts of SPS in following four different ways (i) firstly, they reduced overall trade flows (ii) secondly, they diverted trade from one trading partner to another by laying down regulations that discriminated across potential suppliers (iii) thirdly; they completely prohibited trade by imposing an import ban or by prohibitively increasing production and

\[\text{As stated by the exporters, issues affecting their exports of FFV included insufficient coordination among border agencies, multiple border controls, long waiting times reducing the quality, thus price of perishables, non-availability of online documentation processing, lack of the cross-border data harmonization and use of international standards, high duty rates in some markets, tariff rate quotas, escalations, emerging RTAs etc. Other problems included basic infrastructure cool chain management a. Transport (Local transport, loading/unloading) b. Cold storage (poor post-harvesting tech) c. Process (Washing, Waxing) d. packaging, insufficient training opportunities and raising the level of productivity and quality standard to international demand.}\]
marketing costs and (iv) fourthly by increasing costs or raising barriers for all potential suppliers.

The trade impact of the emerging SPS standards was clearly visible by the reduction of exports of certain FFV including mango, grapes, potatoes, pineapples and curry leaves etc. This stringency of SPS barrier was seen increasing over the period of time wherein Indian FFV exporters faced these barriers as they penetrate industrialized country markets striving to increase their market share. Historically, the standards applied to international trade in horticultural products were quality standards related to varietal selection, physical and visual characteristics, tolerances for foreign matter, and other variables giving rise to mandatory country level standards to be implemented by customs including HACCP, ISO 9001, GLOBALGAP, Organic and ISO 22000:2005.

Further it was witnessed that apart from these public standards, the proliferation of the food safety standards were also been at the private level (through supply chain requirements and in response to the demands of consumer and other civil society organizations). The private food safety guidelines and standards (EUREP-GAP, HACCP, BRC, SQF, and ISO 9000) were being imposed by importers and retailers at different levels in the food supply chain production, handling, and distribution of fresh fruits and vegetables.

The analysis of the trade flows of FFV from India since the inception of WTO SPS agreement in 1995 further reinforced the fact that the declining trend of exports of fruits and

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6 Fruitful results of this agreement were seen in the form of increased value of exports in almost all the major European markets and also USA for three consecutive years until 1998. This success story continued for UK, Germany and USA. However, this trend could be continued only until the end of 1998, which was the year of the introduction of first private standard of UK known as British Retailer’s consortium (BRC). This impact of BRC raising the implementation cost of compliance and thus having negative impact on the trade flow were seen by the sudden reduction of almost all the fruits exported from India including mangoes, grapes, dates, pineapples, apples, pears etc during the BRC implementation year (1998-1999).

The emergence of BRC standard in 1998 was followed by the initiative from German food retailers who developed the International Food Standard (IFS) emerged in 2000. In 2003, French food retailers further elaborated IFS became the first pan-European collective post-farm-gate private food safety standard. The impact of this standard can be visualized by the complete absence of France as an export market in 2003 onwards.

While BRC Global Standard for Food safety, Dutch HACCP and the IFS were operating side-by-side in Europe, while the SQF standard had been developed in Australia and subsequently migrated to the United States. Thus, many of the larger food processors were simultaneously complying with, and being certified to, multiple private food safety standards. Situation improved with the emergence of a new collective standard on Global Food Safety Initiative (GFSI) in 2005. This improvement was well depicted by gradual rise in the exports of FFV since 2005 in case of UK, Belgium and Germany amongst European markets and to some extent in USA.
Vegetables from India had primarily been the outcome of emerging private standards in domestic markets of the global importers for FFV.

The increasing stringency of these standards resulted into the trade loss for the exporters in the form of import rejections in some cases and complete export ban in case of frequent and repeated rejections. This was clearly substantiated by the analysis of the import detentions of FFV compiled as Import Refusal Reports (IRR) by USFDA and RASFF notifications by European Food Safety Authority. Trade implication of these standards was also visible through the declining trend of exports of vegetables which had faced these rapid alerts. Moreover, for vegetables on which the frequency of RASFF notifications was high faced a much steeper decline in the export value as in case of okra and curry leaves. The challenge faced by the Indian exporters became much higher on account of increased number of independent food safety agencies.

In addition to the strict import procedures emerging out of country regulations, the trade impact was found to be worsened due to SPS implementation issues in the form of violation of WTO SPS agreement further throwing challenge for an exporter. The case evidences collated out of in-depth interactions with the Indian FFV exporters across various states in the country highlighted some of these export challenges.

Further respondents reported that these SPS standards impeded trade even when they were imposed on genuine health and safety considerations because of additional compliance costs imposed on them. SPS standards were different and costly to practice within the supply chain. Since the supply chain of horticulture in India was long and highly fragmented, the cost of SPS standard was primarily been estimated on the basis of primary surveys at various stages and with various players through-out the supply chain.

The analysis brought forth two kinds of standards which were currently governing the trade of fruits and vegetables (i) mandatory standards which were set by governments and are enforced by liability rules in case of non compliance and (ii) voluntary standards which

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7 Australia and New Zealand had created distinct agencies for food regulations and standard-setting, while in Japan an independent food safety advisory commission had been established. In the United States a federal Council on Food Safety was established to coordinate the efforts of various agencies.
were set by various stakeholders to harmonize food safety regulations or to meet specific attributes.

The cost components towards SPS compliance included were direct, indirect, risk and hidden. The overall cost was divided into two groups (i) Macro cost which included the expenditure that had to be incurred by the exporting firms and government bodies. (ii) Micro cost which was incurred by producers and traders for the same purpose. These were the costs incurred by producers and exporters in order to comply with demands of importing countries and private clients. They included changes in producing systems, infrastructure building and upgrading, training, consultancy services and certification costs. This included cost of establishing traceability, record keeping and self-inspection, site management and risk assessment, worker's health safety and welfare, fertilizer use, harvesting, produce handling, environmental issues and certification costs etc. The cost of compliance had been captured by the change in total cost of production that arises from complying with the SPS standard i.e “before” and “after” production cost data has been used to estimate the cost of compliance.

This impact of SPS regulations varied from one firm to another; from one product to another and one country to another for the same product. The research study therefore dwelled further into the understanding of the various factors which affected the ability of the exporting firm to comply. It was seen that age and size of the firm were two major factors along with the target destination which affected the firm's ability to comply to the SPS regulation. Other domestic inefficiencies and constraints faced by the respondents towards SPS compliance was access to compliance resources which included information on SPS standards themselves, scientific and technical expertise, appropriate technologies, skilled labor, general finance etc. In case of the unavailability of these resources locally, they were needed to be obtained overseas, significantly increasing the costs of compliance.

In certain cases the conformity assessment procedures associated with SPS standards were found difficult and costly to put into practice within supply chains in India. In other cases, the SPS standards of developed countries were found to be incompatible with the production systems employed in developing countries. Access to the actual information on SPS requirements in foreign markets was stated as a problem since it caused significant delays and confusion. Nature of marketing and supply chain models used in marketing of
fruits and vegetable in India, inconsistency between domestic laws and international regulations, administrative mechanism currently prevailing in India was also reported to be hampering the exporter's ability to comply with SPS.

The fact that these problems existed despite the presence of multiple agencies involved towards management of Food Safety System in India; gave rise to a possibility of existence of lack of proper understanding on these problems as stated by the exporters; by the government agencies dealing in policy making of food safety regulation in India. Perception analysis of Indian exporters and government agencies resulted into identifying if there was any perception mismatch between the policy making agencies and exporters towards these inefficiencies. Independent sample t-test between exporter and governments on domestic inefficiencies showed that there was no statistically significant difference in the means of two groups in case of logistical problem, infrastructure, short compliance period and limited system for fresh produce traceability.

Statistically insignificant differences in mean between exporter and government on these issues reflected that both exporters as well as government agencies were well aware about these problems and that there existed no perception gap. This was quite evident from the supporting schemes extended by various government agencies including APEDA (Agriculture and Processed Food Export Development Authority), MOFPI (Ministry of Food Processing Industries), NHB (National Horticulture Board), DST (Department of Science and Technology), QCI (Quality Council of India) etc working towards addressing these issues in the form of extending financial support and assistance towards SPS compliance.

Perception gap between exporters and the policy makers was visible in other domestic inefficiencies. While the priority areas for policy makers were awareness, nature of marketing chain and limited application of HACCP, the priority areas for exporters wherein this group looked up to the government for support was limited farmer knowledge on Integrated Pest Management and lack of capacity to undertake Pest Risk Assessment.

However, despite the fact that the government agencies were well aware of the changing regulations in the export markets, access to information was perceived as major constraint by the exporters as compared to government. This was because of the absence of any formal SPS notification system working in the country towards the dissemination of this received information from WTO in the form of the SPS notifications to the
exporters/packers/farmers. The next most pertinent concern by the exporters wherein they looked up to the government and policy makers was the revamping of the internal regulatory structures\(^8\).

However, there were challenges faced even by the government agencies towards setting up their priorities and focus during policy making towards SPS management. These were in the form of variations in the perception of the consumers/government/importers across export markets on various SPS dimensions.

Therefore, in order to capture these variations in perceptions across countries, the SPS dimensions were divided into five major categories (i) food safety (ii) plant health (iii) product quality (iv) quality control standards and (v) social standards. The total number of 101 respondents across 15 importing countries were divided into three major categories (i) Developed markets (USA, EU, Japan and Australia)(ii) Developing country markets (Middle East and developing countries of South East Asia) and (iii) Least Developed markets (Bangladesh and Lao PDR). Respondents across these three group of countries were asked to rate their preferences for the above listed SPS dimensions on the scale of 1 to 5 with (5) as “most prior” and (1) as “least prior”. In order to identify whether there is any statistically significantly difference between the perception of Developed, Developing and LDCs about various SPS dimensions, one way ANOVA test has been conducted.

Apart from the difference in the perceptions between the three groups of countries the challenge of the policy makers also included the perception variation between the Indian FFV exporters and the foreign importers. In order to capture the perception gap between Indian exporters and foreign importers across the three country groups together, independent sample t‐test comparing the mean responses of the two groups (i) Indian Exporters and (ii) Foreign Importers was conducted.

\(^8\) There is still no enforcement mechanism in India to compulsorily check the quality of export consignments before exporting and therefore the acceptance of most of our FFV exports were on the whims and fancies of the custom authorities in the export market. Moreover, in framing the AGMARK standards there were little consultation with domestic traders. Export Inspection Council of India is the authorized agency from India for signing such equivalence agreement. Since EIC does not deal with fruits and vegetables, no equivalence agreements exist till date for this sector thus raising the constraint faced by the exporters towards SPS compliance in case of difference in the processes used by the two countries even if the ALOP (appropriate level of protection) is maintained.
The analysis of the perception mapping between Indian exporters and the importers in three different group of countries i.e developed, developing and LDCs brought out the fact that in most of the SPS dimensions, except plant health; perceptions of the Indian exporters matched with that of least developed countries.

The study highlighted plethora of SPS dimensions that still needs to be taken care off while exporting to the developed country markets. It is because of this reason most of the Indian FFV exports are concentrated towards developing and least developed markets. Considering the fact that the developed markets are the major importers of most of the fruits and vegetables in which India has high production potential; strategies to boost our exports to these markets by laying concentration on the policy on the issues highlighted in the study becomes important. Further understanding from that most of the competing suppliers of FFV to these developed country markets hailed from Asian and South East Asian countries, study finally describes some of the strategies executed by these competing suppliers of FFV in the international market which if followed would help Indian fruits and vegetable exports find place in the developed country markets.