Chapter VII
Challenges, Issues & Strategies for SPS Compliance

7.0 Introduction

Chapters V and VI have clearly established inverse relationship between the diverse SPS regulations across various export markets both in the form of public as well as private standards and the trade flows of FFV from India thus proving the trade impact of these standards. This also clarifies the question raised in Chapter I on the reasons of poor presence of Indian FFV in the international market despite the country being the largest producer of most of the fruits and vegetables.

This chapter therefore tries to dwell further into the understanding of the various factors which affects the ability of the exporting firm to comply. The chapter would try to explain the reasons behind the lack of compliance in the form of either extreme divergence in the perception levels across existing export markets for India and major importers in the global market, or the lack of awareness amongst the exporting community on the prevailing international standards leading to the perception gap between the priorities of Indian exporter and the actual requirements of the foreign importers.

Institutional mechanism for food safety management in India is analyzed in detail to evaluate the existing role of governmental support in this context, focus of the government policies on the actual complexities faced by the Indian exporters and the action taken by the Indian government towards the regulatory changes in the global market. This has then been compared by the Food Safety Mechanisms established in other developed and developing countries. The lessons drawn through these comparisons finally are used to formulate strategies to enhance the presence of Indian FFV in the international market through better compliance with these standards.
7.1 Estimation of factors affecting the SPS compliance ability of Exporter

The earlier chapters have clearly indicated various implementation issues faced by the farmers, packing houses and the exporters. However the analysis of the responses from the exporters across various regions in the country dealing in variety of fruits and vegetables, it was seen that these impacts varied between one firm to another; from one product to another and one country to another for the same product. Further, the cost of compliance varied depending on the type of products exported and the destination of exports. For instance, when a country is an exporter of sensitive products, it is often more subject to the risk of rejection by importing countries.

Cost of compliance depended on the supply chain used (details of the supply chain prevalent in fruits and vegetable is depicted in Annexure 7.1). The interviewees pointed out that producers and processing companies operating in a vertically integrated supply chain (figure below) are supported or importers in the implementation of private standards and guidelines.

Importers or transnational companies coordinate most of the chain activities, implement strict food safety and quality measurements in tandem with the co-operatives, and employ well-trained quality inspectors within the vertically integrated supply chains. Many of these companies including Tesco, Carrefour etc trade fresh produce under their own brand names and, therefore, are very much focused on the safety and quality of their products.

Within the collaborative supply chain, the chain partners are in close contact with one another. This was visible in case of co-operatives like MAHAGRAPES wherein approximately 1500 grape exporters in Pune and Nasik which were registered members of the co-operative were connected with each other through M-commerce.
Farmers not only receive the information about the local mandi prices and change in national regulations, but also are informed about the public food safety (such as phyto sanitary and MRL regulations) and quality requirements, (such as grading and packaging requirements) of the importing country and the specific demands of the retailer by the importer.

This is also prevalent in case of big companies which have entered into contract farming for tomato cultivation in Punjab, Haryana and Rajasthan; for Gherkins in Karnataka and variety of FFV in Tamil Nadu, Maharashtra and Andhra Pradesh. Foreign importers source fresh produce from these big companies which in due course of time becomes the preferred producers for these foreign buyers.

Producers exporting their products through a transaction-oriented supply chain or an importer-driven supply chain deal with intermediaries who do not inform them about the safety issues and often are neither aware nor well-informed about the food safety and quality demands of buyers. Consequently, these producers have not implemented private standards and, therefore, do not comply with private food safety and quality requirements.
The ability of SPS compliance depended on the age and size of the firm. For instance, small scale producers are not able to invest in technology, quality systems, laboratories, specialized staff and training and education and depend on traders or co-operatives as compared to the large established units which can absorb these costs due to economies of scale. This compliance capability further reduces as and when the food safety regulations existing across markets increased in number as well as stringency and the cost involved. In addition, SPS standards sometimes diverge considerably across importing countries, making meeting standards costly and cumbersome for exporters. There are numerous costs associated with attempting to deal with the variability of standards across export markets and over time.

This has also been explored through the regression analysis wherein the SPS compliance capability of the firm as a dependent variable had been regressed against age of the firm, size of the firm and the stringency of the market as independent variables. Multiple regression model framed was as follows:

\[
\text{SPS compliance ability of the exporter} = a + \beta_1 \text{(size)} + \beta_2 \text{(age)} + \beta_3 \text{(Market stringency)}
\]

Export markets targeted by the respondents were taken for analysis including USA, EU, Japan, Middle East and South East Asia. As indicated in chapter V, stringency coefficient for each market was calculated separately as an independent variable on the basis of responses of the exporters on their perception of difficulty faced in these markets for the set of six dimensions defining SPS compliance (i) phyto sanitary certificate (ii) MRL tolerance (iii) traceability (iv) microbial contamination test (v) GAP/environmental plan for farms (vi) social welfare (vii) packaging specificity.

The regression was independently run against age, size and for each individual market. Table 7.1 presents the regression results for the specified model when the variables are entered simultaneously. This model provides a good fit to the data as evidenced in the relatively high $R^2$ statistic of .304.
Table 7.1: Regression of SPS on Predictors

<table>
<thead>
<tr>
<th>Predictors</th>
<th>Unstandardized Coefficients</th>
<th>Standardized Coefficients</th>
<th>t</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>(Constant)</td>
<td>5.245</td>
<td></td>
<td>11.6</td>
<td>0</td>
</tr>
<tr>
<td>Age</td>
<td>-0.147</td>
<td>-0.144</td>
<td>-1.561</td>
<td>0.122</td>
</tr>
<tr>
<td>Size</td>
<td>-0.386</td>
<td>-0.374</td>
<td>-4.031</td>
<td>0</td>
</tr>
<tr>
<td>Stringency co-efficient</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>European Union</td>
<td>0.154</td>
<td>0.240</td>
<td>2.605</td>
<td>0.011</td>
</tr>
<tr>
<td>Japan</td>
<td>-0.011</td>
<td>-0.017</td>
<td>-0.161</td>
<td>0.032</td>
</tr>
<tr>
<td>USA</td>
<td>-0.083</td>
<td>-0.121</td>
<td>-1.137</td>
<td>0.126</td>
</tr>
<tr>
<td>Middle East</td>
<td>0.123</td>
<td>0.157</td>
<td>1.646</td>
<td>0.039</td>
</tr>
<tr>
<td>South East Asia</td>
<td>-0.092</td>
<td>-0.105</td>
<td>-1.112</td>
<td>0.269</td>
</tr>
</tbody>
</table>

N=92  
R=.551, R²=.304  
F=10.220, p<.000

Results as depicted in the table 7.1 clearly indicate that all the variables were significantly related to the exporter’s capability to comply with the SPS regulations. Using beta co-efficient as the yardstick, the size (beta co-efficient=0.374, p=0.000) had the largest effect on the capability of the firm towards SPS compliance. Negative value of the beta co-efficient depicts an inverse relationship between the compliance capability and the size of the firm which means that as the size of the firm increases, the ability of the exporter to comply to SPS requirements increases due to economies of scale and vice versa. This is clear by the fact that in compliance with SPS measures, small exporters (ratings between 1-3 i.e. micro, small and semi medium) are at a disadvantage vis-à-vis large ones (ratings 4 & 5) because of the fact that they have to bear higher unit cost of compliance even if all other constrained were removed. Small-holders faced problems in meeting standards, particularly private ones, in terms of quality, food safety, GAPs and traceability even where infrastructure is suitable.
Similarly compliance with EUREPGAP standards poses several technical and financial problems for Indian FFV producers and exporters. The financial requirements are seen as the main limiting factor for implementation. This is particularly the case for owners of small and medium-sized farms, who are able to pay the cost of certification (approximately $1200), but cannot afford the additional costs of the investment in equipment and infrastructure needed for compliance with traceability, record-keeping, waste and pollution management, worker health, and environmental issues.

Large companies are able to afford these charges; they can purchase all of the required equipment and facilities within six or seven months (a maximum of one year). Small- and medium-sized farms cannot afford to pay for these costs all at once, so they tend to prepare for the requirement in two or three years.

**Case 7.1 : Upgrading for BRC: the challenge for a smaller company**

One such firm is examining the prospects of transitioning toward becoming supplier of pre-packed vegetables and one which would have in place the management systems and facilities to conform with BRC standards. This firm presently has annual produce sales of 600 tons, implying a turnover of perhaps $1.4 million and retained profit in the range of $40,000 to $60,000. It recently undertook a feasibility study that determined that it needed to invest just under $150,000 in pack house modifications and equipment to reach the necessary standard.

Such investment would involve:

i. installing temperature control equipment in the packing area ($40,000);
ii. partitioning cold rooms to accommodate pre-cooling, cold storage of ungraded produce and storage of graded produce, all entailing new equipment ($38,000);
iii. installing produce washing and drying equipment ($35,000);
iv. lining the packing area and cold rooms and ceilings with panels coated with food grade materials ($19,000); and
v. Several other measures, including the development of an appropriate documentation system. This would not be the end of the story. The firm also needs to hire the necessary food technology staff, develop a HACCP system, and develop an effective system of traceability for its produce. This will cost some additions tens of thousands of dollars.
For vegetables other than tomatoes, compliance with the EUREPGAP standard is likely to incur similar costs. However, for citrus, some adjustments should be considered, such as the mobility of sanitation and hygiene facilities, which would increase the costs. For these reasons, EUREPGAP is now implemented only in large farms in Nasik and Bangalore region that have more than 400 ha of oranges and more than 100 ha of tomatoes respectively.

Supply chains are longer and more fragmented in India as a result of which the cost of establishing systems of traceability and supplier quality assurance are prohibitive, in particular for small producers.

Age of the firm also have an effect on the ability of a firm to comply with SPS regulations although not as effectively as that of the size since the beta co-efficient is just 0.144, p=0.122. Negative value of beta co-efficient indicates that as the firm grows older its ability to comply with SPS increases. This is true since the interviewers argued that foreign importers and retail chains like Tesco, Carefour etc preferred to collaborate/integrate with only older firms which have established credibility in the local market and also as a consistent supplier in the foreign market. Hence newer firms do not get the opportunity to participate in the vertically integrated supply chains. Therefore food safety and quality issues could not be controlled and monitored well which otherwise was possible in case these firms would have been the part of the supply chain wherein different chain activities would have been under the responsibility of one corporation. The safety and quality of the products would therefore been very high reducing the probability of export rejections and thus increase in the ability towards SPS compliance.

Moreover, size and age of the firm also have a combined effect on the firm’s ability. Smaller units face a higher unit cost of compliance because of their small size. As a result, they will be driven out of market.¹

¹ For example in the case of Chile “it is exceptional to find small producers involved in the fruit market (OECD, 2006,17). In Kenya, the number of small holder reduced by 60 per cent between 2002 and 2006 because of their lack of capacity to comply with SPS measures (UNCTAD, 2007).
As the risk of exclusion from the export market would be higher in case of small holders, there is a tradeoff between export expansion and negative distributional impact of compliance with SPS requirements.

The rapid change in SPS measures, regulations and notifications of new regulations was another problem faced by the respondents in preparing for compliance since it imposed extra costs on exporters and created uncertainty for them. The period allowed for compliance with developed country SPS standards turned out to be an important factor influencing compliance costs. In many cases respondents expressed their need for longer time to comply due, in part; to limited access to compliance resources.

This was most prevalent in case of respondents catering to European Union markets wherein the labeling and packaging requirements changed frequently as can be seen through case 5.13 in chapter V. Also the MRL levels for okra have been revised at very short intervals as per GCC regulations. (please refer case 6.4 in chapter VI)

In certain cases, respondents were not able to comply within the specified period and therefore were prevented from exporting. In the short term, this cost was in terms of lost revenue which was significant. They also lost customers and/or market share that affected their long-term export performance. This again was the case in the European market in case of export loss of 250 crores in case of bulk rejections of Indian grapes in 2010 (case 5.4 in chapter V) This all has lead to the perceptions in the mind of the exporters as EU to be the most stringent market (beta coefficient = +0.154, p=0.011) amongst all the markets considered, followed by Middle East (beta co-efficient = + 0.123, p=0.039).

As compared to EU and Middle East, USA was not considered as an important market for SPS constraint. Most of the respondents interviewed indicated high transport and logistics cost as the major trade restrictive factor in case of USA (beta co-efficient = - 0.083, p=0.0126). Most of the respondents did not cater to Japanese
market resulting into lower beta co-efficient values of -0.011, p=0.032. These differences in the stringency co-efficient across developed markets may also be attributed to the variation in the pesticides regulation across EU, USA and Japan as explained in Annexure 7.2.

South East Asia has been a newly opened market for exporting fruits and vegetables from India after the Indo-ASEAN agreement came into existence since January 2010. The trade agreement on one hand have been able to reduce tariffs to a large extent, but also have been able to negotiate on non tariff barriers including SPS issues which is reflected as a lower beta co-efficient value of – 0.092, p=0.269.

It was also witnessed that despite the existence of the problems stated above (frequent changes in regulations, short notice period etc); the company’s strategy also played a major role towards their ability to comply or else compelling the company for the diversification in the export market or the product.

Firms which were newer and also smaller generally had the tendency to have a short term strategy with major focus on finding a foreign buyer rather than a willingness to invest for the long term and therefore have a much higher probability to shift in case of SPS emergency.

Since it was assumed that the tendency of the firms was one of the parameters responsible towards deciding their ability to comply failure of which resulted into the export diversification, the firms were asked to state the reason of their going for compliance. The choices given to the firms were (i) effect on the company (ii) because consumers demand (iii) because standards demand it and (iv) because it is required by law. Firms which opted for reasons (i) and (ii) were rated as proactive firms and the firms which chose (iii) and (iv) i.e. waited for standards to become law were rated as reactive firms.

Finally the strategic options open to developing countries are not limited to compliance. Countries or individual private sector exporters can exit, choosing not to comply with the standards being imposed in a particular market.
This implies switching customers, in the case of a private standard—or exiting export markets altogether.

The firm or farmer may choose to switch to different products for which the needed risk-management measures are less problematic or costly. Such a strategy may be employed if compliance would yield a fundamental loss of competitiveness or very negative economic and social impacts, if resources could be better spent elsewhere, or if there are profitable alternative markets that have less demanding standards. (World Bank, 2005). This gave rise to the research question that which circumstances leads the strategic decision of an export firm (i) is it the reason with which the firm comply with an SPS measure or (ii) the product it is exporting or (iii) the frequency of the change in standards in export destinations or finally (iv) the insufficient notice period.

Therefore in order to check whether the reasons for compliance towards SPS combined with poor notification period have an impact on the firm’s decision to go in for diversification towards newer markets, *binary logistics regression* was used wherein shift was considered as a dependent variable and was regressed against company’s strategy and notice period given by the importing country as independent variables. The logistic regression formulae applied was as follows:

\[
\text{Decision to shift} = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \xi_i
\]

where:

- $X_1$: Firm’s approach
- $X_2$: notice period given by imp country

Logistic model has provided the probabilities about the various determinants of shifting of the exporters. Logistic regression is basically a choice model and had been used when decision of an exporter to shift into newer markets depended on the firm’s strategy i.e reactive or proactive and notice period given by the importing countries in case of the change in their food safety regulations. Logistic regression is

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2 Since the respondents outcome on the dependent variable (shift) was in the form of only two outcomes; either “yes” or “no”, binary logistic regression was used.
suitable where the dependant variable is the firm’s decision to shift is taken as and 0 if otherwise.

Under the log model the predicted value of dependant variable has been interpreted as a probability that an exporter has chosen a certain alternative given its characteristics as identified by the values of the explanatory independent variable. The model has been used to investigate the association between an exp. Decision to shift and identified factors like time given and reactive and proactive measures that causes the shifting. Thus the model has allowed for the measurement of the effect of each factor and characteristics on the exporters decision to shift. A positive correlation increases the probability while a negative decreases the probability of the outcome being in either of the two dependent variable category. In predicting the probability of multiple independent variables on a single dichotomous dependant variable the model used is:

\[ P(Y) = \frac{1}{1 + e^{-z}} \]

Where \( Z = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \ldots + \beta_n X_n + \xi_i \)

Where \( X_n \) = Set of independent variables
\( \beta_0 \) = Intercept term
\( \beta_n \) = a set of parameters for the independent variables
\( Y \) = the dichotomous dependant variable
\( P(Y=1) \) = the probability of exporter’s shift into newer markets

**Table 7.2: Results of the logistic regression**

| Model Summary |  
| --- | --- | --- | --- | --- |
| -2 Log likelihood | Cox & Snell R Square | Chi-square | df | Sig. |
| 56.282 | 0.542 | 72.643 | 2 | .000 |

Initial Log-likelihood Function: -2 Log Likelihood = 128.925

<table>
<thead>
<tr>
<th>Variables in the equation</th>
<th>B</th>
<th>df</th>
<th>Sig.</th>
<th>Exp(B)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reason for compliance</td>
<td>7.654</td>
<td>1</td>
<td>0.000</td>
<td>210</td>
</tr>
<tr>
<td>Time given(1)</td>
<td>-3.094</td>
<td>1</td>
<td>0.003</td>
<td>0.045</td>
</tr>
</tbody>
</table>

a. Variable(s) entered on step 1: Time given.
Shifting Choice Model

The decline in the value of -2 log likelihood explains the improvement in the predictability of the model by the inclusion of independent variable. The value of -2 log likelihood is 128.925 with the constant. With the inclusion of independent variable, the value of -2 log likelihood has reduced to 56.282 the reduction of value of 72.643 told that the model has better predicted the choice for shifting than it was before when only constant was included. After adding the predictor variable the value of Chi-square is 72.643 with degree of freedom 2 and significance level p<.000, which reflects that the model has better explained the choice for shifting with this predictor variable compared with only the constant. The value of cox and snail R$^2$ comes out to be 0.542 which reveals that 54.2% variation in shifting is explained by predictor variables. Interpretation of the results is made through the values of Exp (β). The values of Exp (β) = 210.9 reveals that the firm’s which chose reactive situation i.e waiting for standards to be made mandatory by law; are 210 times more likely to shift. The negative sign of notice period provided by the importing countries at the time of changing the regulations indicates that the firm’s dealing in the commodities/countries which were given enough notice periods to comply with the changed regulations, are more likely to not shift by 0.045 times than shifting.

The above stated results also highlight the relative impact of the two independent variables i.e firm’s approach and the notice period given on the decision of the exporter to shift. As seen in the table above, the relative importance of the firm’s strategy is much higher than the notice period given in controlling the decision of the firm to shift. This would certainly mean that even if the developed countries would have given longer time frame for the Indian exporter towards SPS compliance the firms would still have been forced to look either to different markets or different products until the time the attitude of the Indian exporters does not shift from reactive approach to the proactive approach.
This can clearly be seen by the fact that out of the small sample of 93 exporters of FFV across different regions almost 73% of the firms waited for the governments to make the laws mandatory. As a result of which, even in situations where enough notice period was given by the importing countries under special and differential treatment for developing countries, exporting firms which were reactive still looked for export market diversification. The behavioral pattern when analyzed location wise indicated that the firms which were proactive only hailed from western zone i.e Maharashtra and Gujarat.

**Figure 7.1: Analysis on firm's strategic approach towards SPS compliance**

![Chart showing proactive and reactive firms across regions]

When interviewed on the reason of the firm’s proactive approach, it was found that these firms were large firms playing into vertically integrated supply chains, and were in close contact with big retail chains in the US and European markets including Carefour, TESCO etc. As a result of which these firms were informed well in advance about the expected changes in the public as well as private standards. Therefore the benefit of compliance turned out to be higher than the cost incurred in complying with the standard. (Kay Bee exports, Mumbai)

The case evidence as stated above brings forth the fact that on one hand wherein SPS standards act as a trade barriers restricting market access in major export markets, on the other hand, stricter standards can also provide a stimulus for investments in supply-chain modernization, provide increased incentives for the

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3 Supply chain models working in India for fresh fruits and vegetable sector are explained later in the chapter.
adoption of better safety and quality control practices. Thus, compliance efforts have been judged in terms of the extent to which compliance enhances competitiveness, on a sustainable basis. To be considered successful, compliance measures should generate benefits that clearly exceed the associated costs—direct and indirect, recurring and nonrecurring.

Competitiveness has therefore been measured by changes in absolute levels of exports to a given target market, changes in market share, or changes in unit values relative to direct substitutes from other sources. Respondents were therefore asked to evaluate the benefit vis-à-vis the cost incurred towards SPS compliance in the long run. The benefit cost parameters of the SPS standards as collected by the respondents were summarized in the table 7.3.

Table 7.3: Costs and benefits of complying with SPS standards

<table>
<thead>
<tr>
<th>Costs</th>
<th>Benefits – Harder to compute</th>
</tr>
</thead>
<tbody>
<tr>
<td>Upgrade of laboratory infrastructure</td>
<td>Crisis containment, as when traceability system prevents an alert from becoming a crisis</td>
</tr>
<tr>
<td>Upgrade of processing facilities</td>
<td>Increased attention to overall efficacy of controls</td>
</tr>
<tr>
<td>Investments in farm-level facilities to comply with GAP requirements</td>
<td>Access to more remunerative markets and supply chains</td>
</tr>
<tr>
<td>Reduced investment in new product development</td>
<td>Greater efficiency, thus lower costs</td>
</tr>
<tr>
<td>Reduced investment in domestic food safety controls</td>
<td>Less waste in production process</td>
</tr>
<tr>
<td>Collection and analysis of laboratory tests</td>
<td>Reduced incidence of product inspection and detention abroad</td>
</tr>
<tr>
<td>Additional costs for ‘certified’ raw materials</td>
<td>Enhancement of product quality</td>
</tr>
<tr>
<td>Additional overhead costs for implementing HACCP</td>
<td>Higher morale of inspection and production staff</td>
</tr>
<tr>
<td>Reduced flexibility in production processes</td>
<td>Improved reputation of firm and/or country</td>
</tr>
<tr>
<td>Reduced enforcement of domestic food safety control</td>
<td>Improved worker safety and reduced environmental degradation</td>
</tr>
</tbody>
</table>

Source: Compiled by Exporter’s responses and World Bank (2005)

This benefit cost perception in the minds of the exporters had prompted their decisions to either (i) comply or (ii) exit/shift or (iii) raise voice. Frequency analysis conducted to understand these reactions of the respondents depicted that around 41% of the respondents felt that they had been benefitted in long run by complying with the standards.
The benefits majorly turned out to be either in the form of increased credibility (35%) or better price realization (65%) as indicated by Kay Bee exports Mumbai. This firm dealing in exports of pomegranate to EU was able to negotiate for 7.5£/box. The unit price increased to 9€/box after the firm complied with the revised European standard.

**Figure 7.2: Impact of firm's strategic approach towards benefits of SPS compliance**

Similar to this there were many incidence of positive impact of compliance reported by the respondents. Illustrative list of net profit margins for large FFV exporters have been listed in table 7.4 below.

**Table 7.4: Illustrative Net Profit Margins for Large vegetable exporters**

<table>
<thead>
<tr>
<th>Product</th>
<th>Net profit (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Okra, loose in carton</td>
<td>2–4</td>
</tr>
<tr>
<td>Extra fine beans, top/tail in 200 gm tray</td>
<td>4–6</td>
</tr>
<tr>
<td>Chilies in 200 gm bag</td>
<td>6–8</td>
</tr>
<tr>
<td>Shift in Banana packaging from corrugated fiber box to thermo coal boxes for Japanese market</td>
<td>7–9</td>
</tr>
<tr>
<td>Runner beans, sliced in 335 gm bag</td>
<td>10–12</td>
</tr>
</tbody>
</table>

Source: Compilation from exporter's responses
However large number of respondents (approx 60%) preferred not to comply with the changed standard using exit strategy through either product diversification or market diversification. Table 7.5 illustrates the strategic actions taken by the exporting firms.

**Table 7.5: Strategic actions as reported by Respondents**

<table>
<thead>
<tr>
<th>Exit</th>
<th>Compliance</th>
<th>Voice</th>
</tr>
</thead>
<tbody>
<tr>
<td>Some farmers have switched to supplying processors or the domestic market</td>
<td>Segregation of product sources and development of traceability systems</td>
<td>Bilateral complaints on sampling/testing procedures</td>
</tr>
<tr>
<td>Some exporters have shifted focus from the EU to Middle East markets</td>
<td>Backward integration by leading exporters into own farm production; some forward integration into overseas distribution</td>
<td>Coordinated effort of MAHAGRAPES to request for establishing additional MRL tolerances for CCC used for grapes</td>
</tr>
<tr>
<td>Exporters withdraw from certain markets where they cannot meet or guarantee pesticide residue standards</td>
<td>Expansion/modernization of packinghouses, including high-care facilities</td>
<td>Representation of MAHAGRAPES made to APEDA and Department of Plant Quarantine on timely dissemination of information on changed regulations in the export markets.</td>
</tr>
<tr>
<td>Withdrawal from U.S. mango market as phytosanitary measure is not cost-effective and alternative market outlets exist</td>
<td>Selective contract farming and intermediary vendor screening</td>
<td></td>
</tr>
<tr>
<td>One major firm withdraws from fresh trade and shifts to processed exports to avoid plant-health and pesticide-residue issues</td>
<td>Investment in cleaning, processing, and product sterilization equipment</td>
<td></td>
</tr>
<tr>
<td>Several firms develop own grapes farms in response to widespread disease incidence on out-grower farms</td>
<td>Packers adopt HACCP, ISO 9000, BRC, SQF and other management systems</td>
<td></td>
</tr>
<tr>
<td>Some grape exporters shifted to the business of orange exports</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Grape exporters supplying to Tesco shifted to selling to local distributors in London</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

As indicated in figure 7.2 and table 7.5, the percentage of firms opting for exit strategy as compared to the compliance were far more. The strategic decisions taken by these firms varied from making the shift to new markets to new products to new customers in the same market or lowering down the position in the value
chain shifting from processed to primary exports former facing much stricter quality standard.

These respondents were of the view that most of the shifts and the need for looking into the possibilities into new markets or venturing into new product may be avoided in case the firms did not face certain constraints in the form of domestic inefficiencies which played a heavy toll on the company’s strategy to remain in business or quit due to high cost of compliance of these standards.

7.2 Domestic inefficiencies and constraints faced towards SPS compliance

This section explores the constraints hampering the ability of the Indian exporters to reach and maintain the desired quality requirements as demanded by the export markets thus leaving them with no alternative but to shift/exit the existing market. Some of these are highlighted by case evidences as stated by the exporters presented to illustrate the key findings.

i. Access to compliance resources

A major problem faced by Indian FFV exporters is access to the resources required to comply with SPS standards in developed countries. These include information on SPS standards themselves, scientific and technical expertise, appropriate technologies, skilled labor, general finance etc. If these resources are not available locally, they may need to be obtained overseas, significantly increasing the costs of compliance. For small and medium-sized companies these costs are likely to be prohibitive. This is illustrated by Case 7.2.

Case evidence 7.2: Compliance with Japanese sanitary standards for Mangoes

Before few years back, India was not approved for the export of fresh mangoes to Japan due to fruit fly infestations. However, some companies have been upgrading
their sanitary standards in order to comply with the Japanese requirements in anticipation of approval at a later date. One company that was interviewed reported problems obtaining the required technical expertise on vapor heat treatment and modern processing equipment to comply. They had had to bring in experts from New Zealand and Australia and import equipment at great cost. To recoup these costs, the entire output of the company had to be exported to higher value markets, in particular the Middle East.

ii. Nature of marketing chain

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. This was predominantly reported by the respondents which were operating in the transaction oriented supply chains as explained in section 7.1; which normally were longer and more fragmented than in developed countries and, as a result, the cost of establishing traceability and supplier quality assurance was found to be prohibitive, in particular for small producers. This is illustrated by Case 7.3.

**Case 7.3: Traceability Requirements for Indian FFV in Japan**

Since 2006 India was successful at developing its mango exports to Japan on account of lift of ban due to fruit fly infestation. Indian exporters enjoyed this relaxation and could earn a high unit value realization in Japanese market until 2008. Since 2008, the vast majority of mango exporters those were able to take advantage of this relaxation were only large-scale commercial farms. The level of participation of small-scale producers in the export trade reduced. This was due to the fact that the sanitary standards laid down by the Japan required full traceability of FFV down the supply chain. For example, exporters were required to demonstrate that fruits for instance apples originated from regions that are free from fire blight disease. Similar was the condition laid down for other FFV including mangoes. Further, recent requirements for the traceability of individual fruits down

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4 Vapor heat treatment facilities extended by APEDA, MOFPI and NHB have been initiated lately.
the supply chain have necessitated both the branding and RFID tagging of the fruits. The costs of meeting these requirements were found prohibitive for small-scale producers. Furthermore, the costs of implementing such controls were significantly higher if the fruits were procured from a relatively small number of holdings. Consequently, exporters tend to obtain supplies from large rather than small producers wherever possible. Dominance of small players with the average land holdings of approx 1.8 - 2 hectares, further aggravates the issue. This calls for the co-operative structures to be promoted in the country similar to organizations like MAHAGRAPES, MAHAMANGO and MAHABANANA.

iii. Production methods

In certain cases the SPS standards of developed countries are not compatible with the production systems employed in developing countries. In certain cases, these systems need to be radically changed in order to comply. In others, significant levels of new changes are expected which demands a lot of adaptability in terms of religious sentiments, climatic considerations, awareness at farm level etc. Case 7.4 provides an example of this.

**Case 7.4: Incompatibility of Southern India towards BRC implementation**

The technical specifications for the gloves, hats, and clothes in the BRC standard were inappropriate to the climatic conditions in the southern India. It was reported by exporters from Kerala and Chennai that the items were uncomfortable and too hot, and therefore rejected by the workers, who refused to wear the clothes. Also BRC implementation process did not allow the female workers to wear any jewelery etc while working in the packing houses. This was not acceptable to many traditional female workers who refused to take out their “mangalsutra” worn out of religious sentiments.

iv. Access to information
Access to the actual information on SPS requirements in foreign markets is a problem and cause significant delays and confusion. In extreme cases the only source of information is the notification procedures of the SPS Agreement. (Case 5.4: Violation of WTO SPS agreement on Transparency: case of rejections of Indian grapes explained in chapter 5 clearly brings forth the evidence of the loss of 250 crore due to lack of information about changed EU regulation on CCC to be disseminated to the grape exporters in India.

v. Domestic regulations towards marketing of FFV

Case 7.5 highlights the nature of marketing and supply chain models used in marketing of fruits and vegetable in India which hampers the ability of the Indian FFV exporters in complying with the high quality standards demanded in the international market.

Case 7.5: Transportation and inefficient logistics and marketing arrangements leading to quality issues: case of Apples from Himanchal Pradesh

The marketing of agricultural products in India has traditionally been controlled by the state and regulated by the respective state APMC\(^5\) act. In the condition of their inability to sell their apples directly to the private players and in turn the compulsion of selling the apples only through government regulated mandis; after harvesting their crop, the farmers of Himachal Pradesh pack their apples in cardboard boxes and transport by small trucks them to the mandis, which are located within about 20 kilometers of the farms.

Since packing is costly, growers who sell through APMC markets often pack between 22 to 30 kgs of apples in a box that is designed to hold only 20 kgs. As a result, apples deteriorate in quality as they rub against each other during their long

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\(^5\) Agricultural Products Marketing Committee (APMC) Acts. This act requires that all agricultural products be sold only in infrastructure-poor, government-regulated markets (called “mandis”). There are various inefficiencies that occur when supplying apples through APMC markets.
journey from Himachal to the final market. Truckers also typically overload to the extent of 25% resulting in more damage during transit. Authorities are often forced to stop trucks at the border and delay entry into the market. Spending long periods of time in the sun further damages the apples that are transported in unrefrigerated trucks. Moreover, at APMC markets, the apple cartons are unloaded for the buyers to inspect so that the auction can take place. This additional handling and transportation further damages the apples.

The story of inefficiency still continues when the apples reach Azadpur terminal market since it is not GMP certified due to the fact that the lease is on a short-term basis, or even seasonal. Hence, there is a little scope to make improvements. In view of the above mentioned issues, exporters operating in the transaction oriented supply chains procuring apples from the mandis have to bear the brunt of these inefficiencies wherein these apples are not able to conform to international codes and standards (CODEX, HACCP, and EU standards) for food safety and quality assurance.

vi. Internal regulatory structures

The extent and nature of existing regulatory structures for SPS matters in India affects the ability of the farmers and in turn the exporter to comply with standards in developed countries. If SPS standards are in place domestically, the food supply chain will be accustomed to operating in a regulated environment and will better appreciate the need to comply. Furthermore, public authorities may find it relatively easy to implement conformity assessment procedures required by developed countries given that they have an existing enforcement structure. India with little existing domestic SPS legislation and/or weak systems of control therefore finds it difficult to comply.

Case evidence 7.6: Inconsistency between Domestic laws and International regulations
The Central Insecticide Board of India registers pesticides for domestic use. This Board is not responsible for establishing MRLs or ADIs (Acceptable Daily Intakes) of the registered pesticides and there is no linkage between the establishment of MRLs by the Ministry of Health and the registering of a pesticide. As a consequence, sixty percent of registered pesticides presently have no approved MRLs. The present situation has therefore lead to anomalies whereby a farmer can legitimately use a registered pesticide but is breaking the law if he or she sells produce that contains any residues of that chemical as, in the absence of an MRL having been established, the MRL for the pesticide is considered to be zero.

**Case evidence 7.7: Ineffective Surveillance and Monitoring System for Food Safety for India**

As indicated earlier, if SPS standards are in place domestically, the food supply chain will be accustomed to operating in a regulated environment and will better appreciate the need to comply. For this, the National Food Control System of the country should develop strict surveillance and monitoring system. So far, the Prevention of Food Adulteration Act prescribed food standards and also established an inspection system for marketed products. But it did not seek to identify and prevent sources of contaminants. With elongated food chain, rapidly changing technologies and greater consumer awareness, it has become necessary to modernize the Food Control System Table 7.6 summarizes the domestic inefficiencies in the rules and regulations prevailing currently in the country hampering the capability of Indian FFV exporters to come up to the level of high quality requirements across various export markets. This was despite the fact that the food sector in India has been governed by a multiplicity of laws under different ministries and these multiple regulations for food have enacted at different points of time to supplement each other. Hence next section ventures into the estimation of the efficacy of government policies and evaluation of the extent of focus of these agencies towards the above stated domestic inefficiencies by the exporters.
7.3 Evaluation of Governmental Support towards SPS Compliance

In order to evaluate the efficiency of the existing food control system in India, problems discussed in each of the case studies were brought together (Table 7.6). Exporters across various regions in India were then asked to provide indication of the relative importance of these problems as listed broadly with the sub-section headings above. The problems considered as most discouraging for their exports, hence requiring at most attention of the government by being placed as highest priority at times of policy making were asked to be rated as (5) and least to be rated as (1).

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. This may perhaps be arising out of the perception gap between real issues faced by the exporter's vis-à-vis policy focus areas identified by Indian government.

These agencies were therefore asked to conduct the same rating on 1 to 5 scale on similar parameters as that of exporters above. This was followed by in-depth interactions with almost 25 governmental officials from various facets right from FSSAI to Ministries to Industry Associations and also NGOs and academicians and researchers contributing towards policy making in order to understand the cause of the perception gaps.

7.3.1 Perception analysis between Indian FFV exporters and Government agencies

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 t test between exporter and governments on domestic inefficiencies shows that there was no statistically significant difference in the means of two groups in case of logistical
problem (p=0.746), infrastructure (p=0.107), short compliance period (p=0.555) and limited system for fresh produce traceability (p=0.832).

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 is quite evident from the supporting schemes extended by various government agencies involved towards extending support towards SPS compliance.

**Table 7.7: Analysis of Perception gap between FFV exporter and Government agencies**

<table>
<thead>
<tr>
<th>Domestic Inefficiencies</th>
<th>Exporter</th>
<th>Government</th>
<th>t</th>
<th>sig</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean</td>
<td>Std. Deviation</td>
<td>Mean</td>
<td>Std. Deviation</td>
</tr>
<tr>
<td>Logistical Problem</td>
<td>3.50</td>
<td>1.412</td>
<td>3.62</td>
<td>1.408</td>
</tr>
<tr>
<td>Infrastructure</td>
<td>4.76</td>
<td>0.681</td>
<td>3.69</td>
<td>1.182</td>
</tr>
<tr>
<td>Limited system for FPT</td>
<td>4.08</td>
<td>0.669</td>
<td>4.00</td>
<td>1.461</td>
</tr>
<tr>
<td>Short compliance period</td>
<td>4.13</td>
<td>1.147</td>
<td>3.91</td>
<td>0.701</td>
</tr>
<tr>
<td>Awareness</td>
<td>3.16</td>
<td>1.197</td>
<td>3.56</td>
<td>1.338</td>
</tr>
<tr>
<td>Access to Information</td>
<td>3.78</td>
<td>1.290</td>
<td>2.85</td>
<td>1.003</td>
</tr>
<tr>
<td>Internal Regulatory Structures</td>
<td>3.94</td>
<td>0.790</td>
<td>3.40</td>
<td>1.589</td>
</tr>
<tr>
<td>Nature of Marketing chain</td>
<td>3.44</td>
<td>0.823</td>
<td>4.00</td>
<td>0.775</td>
</tr>
<tr>
<td>Production Methods</td>
<td>2.02</td>
<td>1.495</td>
<td>3.44</td>
<td>1.504</td>
</tr>
<tr>
<td>Limited farmer knowledge on IPM</td>
<td>4.82</td>
<td>0.620</td>
<td>4.00</td>
<td>1.291</td>
</tr>
<tr>
<td>Lack of Capacity to undertake PRA</td>
<td>4.58</td>
<td>0.943</td>
<td>3.43</td>
<td>1.222</td>
</tr>
<tr>
<td>Limited Application of HACCP</td>
<td>2.73</td>
<td>1.216</td>
<td>3.80</td>
<td>1.033</td>
</tr>
</tbody>
</table>

Note:
IPM: Integrated Pest Management
FPT: fresh produce traceability
PRA: pest risk assessment
HACCP: Hazard Analysis Critical Control Point

### 7.3.2 Supporting Agencies towards SPS compliance

There are numerous 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.
Understanding infrastructure and logistics as one of the most serious bottleneck towards maintaining the quality of the fresh fruits and vegetables, this has been dealt by almost all the agencies. The schemes extended in this regard are listed in table 7.8 below (details in Annexure 7.3). There are three organizations APEDA, NHB and MOFPI which are responsible towards extending such support to the exporters. APEDA provides support on the infrastructure and logistics in the form of assistance for purchase of specialized transport units for horticulture to the extent of 25% of the cost subject to a ceiling of Rs.2.50 lakhs per beneficiary.

NHB extends the support for refer vans, special transport vehicles, cold storage and Controlled Atmosphere (CA)/Modified Atmosphere (MA) Storage through its Capital Investment Subsidy Scheme for Construction/Expansion/ Modernization Of Cold Storages for horticulture produce not exceeding 25% of the project cost with a maximum limit of Rs.50 lakhs per project.

The integrated cold chain infrastructure scheme of 11th plan of Ministry of Food Processing industries consolidates the scheme for Integrated Cold Chain; Value added Centres, Packing centres and Irradiation facilities of 10th plan and extends it to precooling, mobile cooling, reefer vans etc to cover much wider range of horticulture crops. MOFPI have also come forward with Mega Food Park Scheme to provide adequate / excellent infrastructure facilities for food processing along the value chain from the farm to market. It will include creation of infrastructure near the farm, transportation, logistics and centralized processing centers. The main feature of the scheme is a cluster based approach. The scheme will be demand driven, pre marketed and would facilitate food processing units to meet environmental, safety and social standards.

At the Central Processing Centers: buildings for common facilities like testing laboratory (including equipments), cleaning, grading, sorting and packing facilities (including equipments), dry warehouses, specialized storage facilities including Controlled Atmosphere Chambers, Pressure Ventilators, variable humidity stores,
pre-cooling chambers, ripening chambers etc. (including equipments), cold chain infrastructure including reefer vans, packaging unit, irradiation facilities, steam sterilization units, steam generating units, Food incubation cum development centers etc.

Increasing stringency and mandatory requirements on establishment on traceability systems in developed markets of EU, USA and Japan has drawn considerable attention of export development agencies like APEDA to establish these traceability systems in India. Web-based applications for grapes, pomegranate and organic FFV in the form of “Grapenet”, “Anarnet” and “Tracenet” are some of the initiatives taken by APEDA in this direction.

The satisfaction of the exporters towards this initiative is depicted by statistically insignificant difference between the perceptions. However, a slightly higher mean values for exporters (Mean= 4.08) versus that of the government (Mean=4.00) indicates the expectation of the exporters towards extension of this successful model for other traditional fruits including mangoes and oranges and vegetables.

The issue of short compliance period given to Indian exporters at time of the change in the regulations in the export markets has also been taken up strongly by Indian government with support from G-20 group of countries during WTO-SPS negotiations. After Chairman, APEDA being elected as Chairman of CODEX committee, the possibilities of India's participation in the standard setting meetings is likely to increase which would further work towards the satisfaction of the exporters denoted by statistically insignificant mean values (p=0.555)
7.3.3 Difference in the perceptions between Indian exporters and Policy makers

a. Priority areas for Policy makers

The significant statistical difference between the perceptions of two sides was found in other dimensions of the domestic inefficiencies. The mean scores of policy makers were statistically significantly higher in case of awareness (M=3.56, SD=1.338, t=-1.241, p=.000), nature of marketing chain (M=4, SD=0.775, t=-2.155, p=.034), production methods (M=3.44, SD=1.504, t=-3.471, p=.001) and limited application of HACCP (M=3.8, SD=1.033, t=-2.677, p=.009) thus indicating the priority areas of the government agencies.

Government agencies dealing in SPS in India is abreast with the developments in the country notifications and changing regulations. This is now possible since any new SPS measures are notified to the World Trade Organization (WTO) SPS Committee, as required by Article 7 of the SPS Agreement\(^6\). This has resulted into higher mean values on awareness of the policy makers (M=3.56, p=.000) as compared to that of exporters (M=3.16, p=.000).

<table>
<thead>
<tr>
<th>Domestic Inefficiencies</th>
<th>Perception diff demonstrated by st. sig. t values</th>
<th>Exporters</th>
<th>Policy makers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Awareness</td>
<td>√</td>
<td>(t=-1.241)</td>
<td></td>
</tr>
<tr>
<td>Access to Information</td>
<td>√</td>
<td>(t=2.871)</td>
<td></td>
</tr>
<tr>
<td>Internal Regulatory Structures</td>
<td>√</td>
<td>(t=1.417)</td>
<td></td>
</tr>
<tr>
<td>Nature of Marketing chain</td>
<td>√</td>
<td>(t=-2.155)</td>
<td></td>
</tr>
<tr>
<td>Production Methods</td>
<td>√</td>
<td>(t=-3.471)</td>
<td></td>
</tr>
<tr>
<td>Limited farmer knowledge on IPM</td>
<td>√</td>
<td>(t=2.241)</td>
<td></td>
</tr>
<tr>
<td>Lack of Capacity to undertake PRA</td>
<td>√</td>
<td>(t=3.353)</td>
<td></td>
</tr>
<tr>
<td>Limited Application of HACCP</td>
<td>√</td>
<td>(t=-2.677)</td>
<td></td>
</tr>
</tbody>
</table>

Note: IPM: integrated pest management; PRA: pest risk assessment

\(^6\) These notifications are now readily available on the WTO website (http://spsims.wto.org/).
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. (M=3.78) as compared to government (M=2.85), p= 0.005. 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.

When interviewed, the policy makers expressed that these SPS notifications generally described the broad regulations rather than identify distinct measures, and moreover often fail to link new requirements to specific trade flows. Furthermore, they do not provide a comprehensive overview of existing national SPS regulations since WTO members have only been obliged to notify those measures that have been proposed since the SPS Agreement came into effect in 1995.

Article 7 also requires that countries provide information on their existing regulations “in a manner that is consistent with Annex B, specifically in a manner that enables interested countries to become acquainted with them,” but this requirement has been interpreted as being met by the mere establishment of “enquiry points,” which can provide information for potential exporters upon request. This obligation under the SPS Agreement does not produce documentation of the import requirements themselves.

Realizing the deficiencies of the traditional marketing chains resulting into the deterioration of the quality of the final FFV exported leading to higher frequency of import detentions of Indian exports in foreign markets, policy makers have taken this up as a next priority area. Being acutely aware of the limitations of the APMC Act, the India’s Ministry of Agriculture has amended the act to remove some of the principal rigidities. The changes introduced the concepts of parallel private markets and contract farming and assigned new roles for cooperatives.
Private players are now allowed to open and operate agricultural markets where farmers may sell their produce. There is no requirement for farmers to bring their produce to the APMC market yard as they now have the option of selling their produce directly to private parties, food chains, and retailers. Under the new amended act, food processors and retailers may also sign contracts with farmers and obtain the desired quantity and quality produce. Over the last 5 years, various players like CONCOR, Reliance Fresh, Field Fresh, Mahindra Shubh Labh, and Adani Agrifresh have started procuring FFV directly from farmers without going through the APMC. Case study 7.11 describes this new role played by the private players towards maintaining the quality of the FFV exported.

**Case evidence 7.8: Interventions by Adani Exports in Apple marketing in H.P**

The majority of the apple farmers in Himachal Pradesh are small and in general the road, cold chain power, farm credit, information, and market infrastructure are still very poor. These small apple farmers lack the ability to invest in modern agricultural practices and farm machinery and have low productivity and as such are “price takers.” The lack of appropriate storage and logistics infrastructure ultimately results in higher prices for consumers and apples that reach the consumer in less than optimal condition. Moreover, the auction system at the APMC mandis lacked transparency. After the APMC act was reformed in HP, to capitalize on the untapped horticultural business opportunities resulting from the APMC reforms, Adani Enterprises set up an extensive cold chain infrastructure.

Adani decided to design an entirely new system of buying apples from farmers. Adani Agrifresh started its operations by contacting with farmers to purchase apples at an announced price but with certain quality specifications. Adani decided not to compromise on quality and subjected each apple to firmness and maturity tests prior to purchase. To ensure quality and invest in brand building, Adani made a considerable investment in crates to enable growers to bring apples to its CAS facilities. This eliminated over-packing and overloading practices. Growers were trained on timing their harvest to ensure the proper firmness and maturity of the
apple. Adani also imported computerized apple graders for sorting and to develop a transparent payment system wherein the farmers are compensated based on the color, size, and weight of each apple.

Adani works with around 150 hub operators in Himachal Pradesh who cater to around 4000 farmers. These hub operators receive crates delivered to their doorstep from Adani, which they then distribute to growers who have good quality apples and are interested in supplying Adani. On receipt of apples at the Adani Agrifresh’s pack house, apples undergo quality tests and are sorted and graded for both quality and color by sensors. Once the apples are accepted for quality, size, maturity and color, the hub operator’s account is credited. The apples are then put into CAS for better shelf life. This process continues until the procurement season is over. Adani’s apples conform to international codes and standards (CODEX, HACC, and EU standards) for food safety and quality assurance. Adani Agrifresh sells apples through an extensive network of dealers across India.

Similar to the interventions of Adani through public-private partnership model, new supply chain models in the form of contract farming by Pepsico, Motherdairy and Safal model of FFV marketing, Apni mandi in Punjab, Apna bazaar in Bangalore etc are coming up indicating the modernization of the traditional marketing chains India. The efficacy of the governmental attention and support in this direction is depicted by statistically significant higher mean values for government (M= 4.00, p= 0.034) as compared to the mean values of the exporters (M= 3.44, p= 0.034).

In addition to the legal thrust to strengthen food safety and standards within the industry (explained under regulatory structure below), the voluntary standards in India also have a significant impact on strengthening food safety management systems. Different sectors of industry are simultaneously being encouraged to adopt the HACCP system of quality control to build quality assurance right from the stage of raw material to the final product and to minimize the chances of the rejection of end-products for failure to meet the prescribed standards of quality and safety.
It is proposed to cover the vulnerable industries such as dairy products, fruits and vegetable products in the first instance and extend it to other industries in due course. Sooner or later all food industries shall realize the benefit of this system and adopt these measures within three to four years. Training modules for the adoption of the HACCP system are being developed with the assistance of experts in the area. Responsible personnel of the industry are being given training in developing critical control points and adopting remedial measures.

This high priority on the implementation of these HACCP systems has given it a statistically significant mean value of $M=3.8$ as compared to mean value of $M=2.73$ for exporters at $p=0.009$. This is proven by a recent initiative by the Agriculture and Processed Food Export Development Authority (APEDA) under the Ministry of Commerce and Industry called ‘Quality Produce of India’ – a certification mark for agricultural products. Its objective is to maintain quality and safety standards and to assure the consumer of adherence to quality assurance measures. It applies to agricultural products for export and it is proposed to initially launch the scheme for meat, rice, fruits and vegetables. The certification mark will be granted on the basis of compliance with hygiene standards, implementation of quality assurance systems such as ISO 9000, the HACCP, backward linkage and residue testing of pesticides and contaminants, laboratory facilities, but is again restricted to food for export.

**b. Priority areas for Exporters/packers/farmers**

In case of Indian Exporters, mean values were statistically significantly higher in case of internal regulatory structures ($M=3.94$, $SD=0.79$, $t=1.417$, $p=0.003$), lack of capacity to undertake pest risk assessment ($M=4.58$, $SD=0.943$, $t=3.353$, $p=0.004$), and in limited knowledge on integrated pest management ($M=4.82$, $SD=0.62$, $t=2.241$, $p=0.043$) than government agencies on same aspects.

One of the most critical problems that were reported by the exporters and farmers was the insufficient information to enable them to judge whether they are applying pesticides in an economic way. Moreover, they were generally not aware that inappropriate pesticide use can exacerbate pest problems. This results in
unnecessarily high levels of use and consolidates incorrect perceptions that intensive use is necessary to deal with the high pest pressure being faced. While farmers clearly knew that they were applying large amounts of agrochemicals they were probably not always aware that such applications lead to residues in the fruits and vegetables they grow. With limited testing facilities, which were usually only available in areas distant from the farms, it was difficult to demonstrate the existence of such residues to 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. The importance of this issue became clear by significantly high mean values (M=3.94, p=0.003) for exporters. However, policy makers were of the view that the existing regulatory structure was adequate and does not require any change proven by lower mean values (M= 3.4, p= 0.003). The section below describes the agencies involved in regulating the SPS issues in India and their effectiveness towards addressing the SPS compliance by Indian FFV exporters.

7.3.4 India’s Current Food Control System

In India multiple regulations for food have enacted at different points of time to supplement each other. The food sector in India has been governed by a multiplicity of laws under different ministries. At present, there are different laws which deal with fruits and vegetables. Some of these are prevention of Food Adulteration Act, Fruit Products Order and various provisions of the Essential Commodities Act. Table 7.10 summarizes the details of the agencies involved and their respective functions and the respective ministries involved.

In India, the Ministry of Health and Family Welfare (MOH&FW) in the Central Government is the nodal Ministry for ensuring the quality and safety of food marketed in the country. A comprehensive legislation called the Prevention of Food Adulteration Act (PFA Act) has been enacted with the objective of assuring the quality and safety of food as well as to encourage fair trade practices.
The Act has been amended a number of times to make the provisions more practical and consumer oriented. This Act is a significant piece of legislation in India as it is the basic statute intended to protect the consumer from the supply of adulterated food and it specifies food safety and quality standards for consumer protection. It lays down that no person shall manufacture for sale, store, or distribute adulterated or misbranded food products not conforming to the standards laid down in the rules. The provisions apply to imported food as well as to food produced in India.

*Essential Commodities Act* lays stress on the quality and hygiene aspects of food. A number of Control Orders have been promulgated under the provisions of the Act. The ones regulating the fruits and vegetable sector includes Fruit Products Order, 1955, which deals with processed fruits and vegetable products. It aims at regulating sanitary and hygienic conditions in the manufacture of food products.

*Standards of Weight and Measures act* govern the sale of packaged commodities in the country and provide the mandatory registration of all importers of packaged products in the country. *Agricultural Produce (Grading and Marking) Act* provides for the promotion of the standardization and grading for agricultural food commodities by pre-testing and certification under the General Grading and Marking Rules, 1986 and 1988. 19 fruits and vegetables are covered under the preview of this act. *Bureau of Indian Standards (BIS) Act* formulates the standards of processed food products and operates under the voluntary certification scheme, ISI Mark. The organization operating the scheme of certification is known as the Bureau of Indian Standards (BIS).

Lastly, *Export (Quality Control and Inspection) Act* aims at ensuring the sound development of the export trade of India through quality control and inspection by the Export Inspection Council (EIC) and the five Export Inspection Agencies (EIA) functioning under the Council. With the establishment of the WTO and the signing of the SPS Agreement, the role of certification in assuring the EIAs has been reoriented.
by putting into place a system of certification covering both, product and systems aspects, in line with international requirements with a view to facilitating export.

Despite the presence of multiple acts and agencies responsible for the management of food safety in India, the issues at the implementation level results into plethora of constraints thus hampering the ability of the exporting firms towards compliance with the SPS regulations. This was quite visible through the exporter's responses on the constraints.

### 7.4 Constraints faced by Indian Exporters towards SPS compliance

Some of the constraints that were stated by the exporters were inadequate testing and inspection facilities, inadequate trained manpower, inadequate standards and regulations and in most of the cases inadequate processing technologies. In order to understand the criticality of the issues faced by the exporters, frequency analysis and mean values were calculated (table 7.11).

#### Table 7.11: Analysis of constraints faced towards SPS compliance

<table>
<thead>
<tr>
<th>Constraint faced by firm towards SPS compliance</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>Total</th>
<th>Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>Insufficient Financial resources for food control</td>
<td>Frequency</td>
<td>5</td>
<td>5</td>
<td>10</td>
<td>12</td>
<td>69</td>
<td>101</td>
</tr>
<tr>
<td></td>
<td>Percent</td>
<td>5</td>
<td>5</td>
<td>9.9</td>
<td>11.9</td>
<td>68.3</td>
<td>100</td>
</tr>
<tr>
<td>Inadequate testing and inspection facilities</td>
<td>Frequency</td>
<td>2</td>
<td>2</td>
<td>10</td>
<td>73</td>
<td>15</td>
<td>102</td>
</tr>
<tr>
<td></td>
<td>Percent</td>
<td>2</td>
<td>2</td>
<td>9.8</td>
<td>71.6</td>
<td>14.7</td>
<td>100</td>
</tr>
<tr>
<td>Inadequate trained manpower</td>
<td>Frequency</td>
<td>56</td>
<td>3</td>
<td>10</td>
<td>14</td>
<td>19</td>
<td>102</td>
</tr>
<tr>
<td></td>
<td>Percent</td>
<td>54.9</td>
<td>2.9</td>
<td>9.8</td>
<td>13.7</td>
<td>18.6</td>
<td>100</td>
</tr>
<tr>
<td>Inadequate standards and regulations</td>
<td>Frequency</td>
<td>3</td>
<td>7</td>
<td>61</td>
<td>15</td>
<td>16</td>
<td>102</td>
</tr>
<tr>
<td></td>
<td>Percent</td>
<td>2.9</td>
<td>6.9</td>
<td>59.8</td>
<td>14.7</td>
<td>15.7</td>
<td>100</td>
</tr>
<tr>
<td>Inadequate processing technologies</td>
<td>Frequency</td>
<td>5</td>
<td>59</td>
<td>8</td>
<td>14</td>
<td>16</td>
<td>102</td>
</tr>
<tr>
<td></td>
<td>Percent</td>
<td>4.9</td>
<td>57.8</td>
<td>7.8</td>
<td>13.7</td>
<td>15.7</td>
<td>100</td>
</tr>
</tbody>
</table>
Mean values were found highest in case of financial resources. 68.3% of respondents considered this as the most critical issue restraining them to comply with frequently changing regulations (mean value= 4.34). This was followed by inadequate testing and inspection facilities (mean value=3.95).

**Figure 7.3: Constraints faced by Indian exporters towards SPS compliance**

This was witnessed in the case of Shreeji mangoes (case 5.1 in chapter V) wherein due to lack of availability of mechanical grading facilities in Surat, firm had to incur extra cost of taking its exports of tomato from Surat to Mumbai. Inadequate standards and regulations were another major issue like in case of some of the pesticides allowed under Pesticides act in India but banned in the export market causing one of the major hurdle internationalization of the existing domestic businesses.

Table 7.12 list down the efforts of the three agencies\(^7\) towards solving these issues. Despite extending plethora of schemes in this regard, the above stated constraints still existed thus highlighting the possibilities of poor efficacy of these announced schemes. First and foremost implementation issue is the overlapping of these

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\(^7\) APEDA, MOFPI and NHB as stated above.
schemes across the three agencies as indicated in Table 7.8. Secondly it was found that the actual beneficiaries of these schemes were large exporters who had the capacity to lobby with the government and influence these schemes in their favour and thus the ratings as indicated in table 7.11 by the exporters was the result of dominance of small and medium exporters as respondents. Thirdly, the schemes of APEDA were only available to the exporters which had certified themselves through the agencies accredited by APEDA. Considering the limited number of such agencies (20 across the country), it became difficult for exporters to manage these certification and thus became ineligible to enjoy the support extended by APEDA.

Similar was the case with the Integrated Cold Chain infrastructure scheme of MOFPI where the eligibility criteria for exporters to avail the scheme was listed as “adequate volume of raw material” and “assurance of consistent supply of raw material”; both the conditions were difficult for the small and medium exporters to fulfill thus making them ineligible for this support. Further the pattern of financial assistance (grant in aid) was limited to 50% of the total cost wherein 25% of the total grant is released only after ensuring 25% of the promoter’s contribution.

This precondition again became an issue for the small exporters who looked up to the support to the government towards the release of seed money to assist them to initiate the process. The poor implementation of these schemes is proven by the fact that the total number of integrated cold chain projects assisted by MFPI across the entire country as of now has only been 108. Most of the funds allotted to MOFPI are returned back with only 10-15% of utilization thus proving the poor implementation of these schemes.

The inspection, sampling & laboratory testing before issuance of the phytosanitary certificate for exports are the responsibility of the Department of Plant Quarantine, Ministry of Agriculture.

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8 This information for the year 2008-09, is as per the latest details listed on the official website of Ministry of Food Processing Industries.
However, exporters have reported incidences wherein despite being accompanied by the phyto sanitary certificate, the consignments were rejected/destroyed at the foreign port. Respondents reported that this may perhaps be due to the fact that the export samples were visually inspected with the help of illuminated magnifier specifically for live insect infestation. It was only in case of pulses where X-Ray examinations were applied.

Moreover, department of plant quarantine stated that it is not mandatory for the exporters to get the certification until the time it was requested by the importing countries. 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. This weak enforcement mechanism also prevails in most of the food safety regulations including Essential Commodities Act, Fruit Products Order Bureau of Indian Standards (BIS) Act, Export (Quality Control and Inspection) Act and AGMARK etc. which are voluntary in nature. (pl. refer table 7.10).

Moreover, in framing the AGMARK standards there were little consultation with domestic traders. A considerable Government-funded program was undertaken in the 1970s to promote AGMARK standards at farmer level. However, the trade did not use these grades for transactions and the standards were not linked to the price received, thus providing no incentive to farmers to grade. Considering the fact that almost 60% of the respondents were reactive in their strategic response and waited for the standards to become law to comply with the SPS standard (figure 7.1), in this context, voluntary nature of the enforcement mechanism and absence of any price incentives has resulted into poor efficacy of the regulations managing Food Safety systems in the country.
Article 4 of WTO SPS agreement on “Equivalence” states that the members shall accept the sanitary or phytosanitary measures of other Members as equivalent, even if these measures differ from their own or from those used by other Members trading in the same product, if the exporting Member objectively demonstrates to the importing Member that its measures achieve the importing Member’s appropriate level of sanitary or phytosanitary protection.

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. (As reported by the EIC official)

Analysis of the suitability of the PFA Act, 1954 highlights the fact that while it can be said that the PFA Act is relatively modern, it has been observed that some of the provisions are not up-to-date. For example, the Act overemphasizes the parameters of finished products by testing end-products only, rather than ensuring the adoption of the principles of the HACCP throughout the whole food chain so as to assure the quality and safety of food from farm-to-table. Introduction of the GMP/HACCP in food processing units – a proposal for the introduction of such requirements under PFA Rules with a time frame of three to four years is still under consideration.

The Sanitary and Phytosanitary (SPS) Agreements and the new World Trade Organization have indicated the path to follow to achieve ready acceptance in world markets. The SPS Agreements call upon members to harmonize their sanitary and phytosanitary measures with international standards (Codex Alimentarius standards). For food safety, the SPS Agreement requires the harmonization of food standards, food additive ADIs, pesticide and animal drug residues, contaminant tolerances, methods of analysis and sampling and codes and guidelines for hygienic practices. So far, India has given little attention to these matters.
As the pressures from the WTO and other international organizations increase due to emerging food safety hazards, the Ministry of Health & Family Welfare, Government of India, which is the nodal agency for the implementation of the Program of Food Quality and Safety, has initiated action to change the existing food laws incorporating the Codex General Principles of Food Hygiene and the HACCP, as well as harmonizing national food standards with Codex standards.

To cater to the contemporary aspects of food quality and safety, the MOH&FW has also been taking steps to implement the principles of the HACCP and Food Hygiene. However, there are challenges faced even by the government agencies towards setting up their priorities and focus during policy making towards SPS management. When interviewed, policy makers were of the view that the variations in the perception of the consumers/government/importers across export markets on various SPS dimensions caused major challenge in this regard. Section 7.5 therefore deals with estimation of these variations across export markets on various SPS dimensions responsible for most of the export rejections of Indian FFV.

7.5 Perception mapping on SPS dimensions across export markets: constraint faced by Indian government agencies towards focused policy making

One of the causes as stated by the policy makers towards their inability in reducing the rejections of export of FFV in global markets was the perception gap across different markets for similar SPS dimensions.

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. In most countries there is a growing demand among the upper middle class and, in some, the middle class for better quality fruits and vegetables, particularly fruits, which in many societies remain a luxury. Richer consumers are beginning to demand better quality. In some countries supermarkets are beginning to address this demand and there are special quality programs, such as the “safe” vegetable program of Viet Nam.
In recent years the standards are also evolved for packaging materials for fresh and processed horticultural goods. Some countries have also given much greater attention to managing food safety and plant health risks by adopting a range of measures, including outright banning of products (or suppliers), specifying the conditions under which products must be produced and/or the characteristics of the end product, or mandating labeling and other information requirements.

Growing array of private standards has brought forth the emergence of certain social standards. Consumers in the developed countries are increasingly becoming aware on issues like ethical treatment, fair trade, involvement of CSR activities by the company, no discrimination on the grounds of sex, religion, nationality etc. leading to certain social certification processes like “fair trade standards” and “SA-8000”, labor standards etc. Certain other issues that are acting as major consideration for Indian exporters of FFV are the difference in sampling requirements, identification and marking, and packaging requirements in most of the developed markets.

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.
The analysis of variance tells us whether null hypothesis is being rejected and if rejected whether they are significant or not.

Table 7.13: Results of one way ANOVA test to capture perception gap across export markets

<table>
<thead>
<tr>
<th>Category</th>
<th>Sum of Squares</th>
<th>df</th>
<th>Mean Square</th>
<th>F</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Food Safety</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Between Groups</td>
<td>2.496</td>
<td>2</td>
<td>1.248</td>
<td>1.32</td>
<td>0.271</td>
</tr>
<tr>
<td>Within Groups</td>
<td>105.887</td>
<td>112</td>
<td>0.945</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>108.383</td>
<td>114</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>108.383</td>
<td>114</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Product Quality</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Between Groups</td>
<td>27.572</td>
<td>2</td>
<td>13.786</td>
<td>14.176</td>
<td>0</td>
</tr>
<tr>
<td>Within Groups</td>
<td>107.946</td>
<td>111</td>
<td>0.972</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>135.518</td>
<td>113</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Plant health</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Between Groups</td>
<td>40.06</td>
<td>2</td>
<td>20.03</td>
<td>13.664</td>
<td>0</td>
</tr>
<tr>
<td>Within Groups</td>
<td>162.72</td>
<td>111</td>
<td>1.466</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>202.781</td>
<td>113</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Quality control</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Between Groups</td>
<td>21.626</td>
<td>2</td>
<td>10.813</td>
<td>9.37</td>
<td>0</td>
</tr>
<tr>
<td>Within Groups</td>
<td>125.793</td>
<td>109</td>
<td>1.154</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>147.42</td>
<td>111</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Social</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Between Groups</td>
<td>13.879</td>
<td>2</td>
<td>6.94</td>
<td>5.457</td>
<td>0.006</td>
</tr>
<tr>
<td>Within Groups</td>
<td>138.612</td>
<td>109</td>
<td>1.272</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>152.491</td>
<td>111</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

From the table 7.13, it can be inferred that under food safety category mean difference between the groups are not statistically significant, p=0.271 which is p>0.05. Likewise it has been found that there was significant difference among the countries under Product quality (F=14.176, p=.000), Plant Health (F=13.664, p=.000), Quality control (F=9.37, p=.000) and Social standards (F=5.457, p=.006).

Other test like Tukey HSD has been conducted to identify which group is different from other in terms of their perception on different SPS dimension. The grouping and multiple combinations of the groups and their perceptions has been indicated in the table 7.14. From the table it can be asserted that under food safety standard there has been no statistical significant difference been found among developed, developing and LDC. As it is depicted through p>0.05.
While in product quality standard perception between Developed and LDC (MD=1.274, p=0.000), Developing and LDC (MD=1.356, p=0.000) were statistically significantly different as it is depicted through p>0.05.

In case of plant health, there was a significant difference between developed and developing (MD=-.950, p=0.001). On the basis of the results established in tables 7.13-7.15, the perception gaps across various export markets were summarized as below.

<table>
<thead>
<tr>
<th>SPS dimension</th>
<th>Perception mapping</th>
<th>Developed</th>
<th>Developing</th>
<th>Least Developed markets</th>
</tr>
</thead>
<tbody>
<tr>
<td>Food safety</td>
<td>√</td>
<td>√</td>
<td>√</td>
<td></td>
</tr>
<tr>
<td>Product Quality</td>
<td>√ (M=4.06)</td>
<td>√ (M=4.15)</td>
<td>× (M=2.79)</td>
<td></td>
</tr>
<tr>
<td>Plant health</td>
<td>× (M=2.38)</td>
<td>√ (M=3.33)</td>
<td>√ (M=3.95)</td>
<td></td>
</tr>
<tr>
<td>Quality control</td>
<td>√ (3.24)</td>
<td>√ (3.56)</td>
<td>× (M=2.28)</td>
<td></td>
</tr>
<tr>
<td>Social standard</td>
<td>√ (2.61)</td>
<td>√ (2.13)</td>
<td>× (M=1.63)</td>
<td></td>
</tr>
</tbody>
</table>

Note: countries with √ had similar perception which was statistically significant  
Country with × had statistically different perception than the other two.

As indicated in the table above, there is no significant difference between the perceptions of the three groups of countries on the food safety issues. Further breakdown of parameters which explained this SPS dimension on food safety included limits on pesticide use and residues, limits on microbiological pathogens, controls on food additives, pack house/factory hygiene requirements and traceability requirements.

However amongst the above rated factors, highest priority given by the customers/importers in USA was on microbiological contamination (cause of 13% import detentions as reported by USFDA), followed by the limits on pesticides use and residues (8%) and food additives (5%).
But for customers/European authorities, the most common concern for fruit and vegetables was found to be the content of pesticide residues. Reasons of these notifications as stated in the RASFF annual report 2009 mainly were the presence of triazophos in gherkins, triazophos and oxydemeton-methy, endosulfan, bifenthrin, carbendazim and ethion in case of fresh curry leaves; chlormequat chloride in grapes, monochrotophos, triazophos acephate and thiamethoxam in okra. While for authorities in Japan, traceability was considered as topmost priority.

In case of customers and authorities in South East Asia, wherever there was a concern expressed by consumers about dangers from fruit and vegetable consumption, this concern seemed confined to dangers from pesticide residues. There was little knowledge of, and hence limited concern about, microbial and parasitic contamination, either by consumers or by the marketing chain. Even stores that stress that their produce is pesticide-free, or at least pesticide-reduced, paid no attention to other forms of contamination. In Viet Nam, a study of Ho Chi Minh City consumers found that location was the dominant factor affecting purchases and was considered more important than produce freshness, safety or price.  

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9 In one survey in Ho Chi Minh City consumers gave as reasons for not buying "safe" vegetables the inconvenient location of the stores selling them (56 percent of responses), a lack of conviction that such vegetables were indeed safer (28 percent) and the high prices (16 percent). In a different survey in the Mekong Delta consumers...
Considering limited capacity and financial resources for country like India, this perception gaps amongst countries on specific SPS dimensions were found to be a major challenge towards policy making.

Both developed as well as developing countries gave equal preference to product quality which included product cleanliness specifications, color, grading and visual appearance. Many consumers decide what to buy only when inside the store. Thus appearance was one of the most important factors affecting purchases. Grading contributed to consumer acceptance, in part by indicating that a degree of selection has already taken place. In some cases internal or external defects do not affect product excellence but were usually seen by consumers as reasons to reject the produce. Freshness, which is the condition of being as close to the harvest as possible, was important for vegetables, particularly leafy ones. Ripeness, used for fruits, refers to the point of maximum edible quality, which may be several months after harvest for fruits that can be kept in store. Colour was an important factor in consumer choice, as an indicator of ripeness in non-climacteric fruit, where no changes take place after harvest, and as an indicator of age, such as where green leaves are yellowing.

In developed markets for instance, Netherlands, consumers laid great emphasis on the physical appearance of produce above everything else, a fact confirmed by the traders themselves who say they are responding to retailers’ requests for produce that looks good on retail display. On one hand, where it gives a breath to the policy makers to decide on the focus considering similar perceptions between the developed as well as developing markets, however the side effects of the compliance with physical attributes has often gone against the enforcement mechanism for pesticide usage at farm level. Farmers contacted said that they had to use pesticides in order to grow produce with an appealing appearance.

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said that the range of safe vegetable products was limited (33 percent), they believed that washing vegetables could remove all toxins (31 percent), prices were too high (12 percent) and store locations were inappropriate (8 percent).
Although many were aware of possible dangers of using pesticides they were not prepared to risk market rejection or possible crop loss by not using them. The desire to produce blemish-free fruit to satisfy traders’ demands is given as the reason why mango farmers in New Delhi used methyl bromide, a chemical which was banned by Indian government.

Although the perceptions between developed and developing markets on the quality control standards were statistically found significant, however there was a wide variation between the countries falling in the same group. For instance, on one hand, Malaysian customers laid emphasis on quality control certifications, while in Vietnam, growers of “safe” vegetables close to Ho Chi Minh City found that they could only sell thirty percent of their production at higher prices through specialist outlets despite having quality control certifications. The remainder had to be sold at wet markets at the prevailing market price. A Safe Vegetables Farmers’ Association in Vietnam, with a production capacity of 30 tons a day, only managed to sell 700 kg a day to a supermarket chain. There was thus a perceived risk associated with trying to supply produce for which there is presently limited market demand.

Similar was the case in Thailand, where consumers were said to have more trust in supermarkets than in certification schemes, despite the fact that, at present, the safety standards of some Thai supermarkets may not be much higher than those of competing wet markets.

It is also interesting to note that the hierarchy of the preferences between the two SPS dimensions i.e Plant health and Quality control were drastically different between the groups of countries. For instance, in case of plant health (which included surveillance requirements, quarantine requirements, pest risk assessment requirements, sanitation requirements and fumigation requirements), maximum priority was given by LDC (M=3.95), followed by developing countries (M=3.33) and lastly developed markets (M= 2.38). However this priority was reversed in case of quality control; where maximum attention was paid by developed markets (M=3.56), followed by developing (M=3.24) and lastly LDC (M=2.28).
This variation therefore creates confusion in the minds of the Indian policy makers since this demanded different policy focus for different groups of markets depending on their priorities. It has been seen that the relative importance laid by the developed markets on compliance towards social standards (Fair trade certificate, Ethical Trade Initiative SA 8000 etc) was much higher than that placed by the developing and the LDC. Consumers in Bangladesh, for instance were not even aware about the existence of such standards depicted by lower mean values. (M=1.63).

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. Hence section 7.6 deals initially with the analysis of the perception gap between Indian exporters across all importers and later on the policy decisions on the most viable export markets flows from the group of countries where there is no significant perception gaps between Indian exporters and foreign importers i.e developed, developing of LDCs.

7.6 Perception mapping between Indian Exporters and 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 for the above stated SPS dimensions. In order to further understand the knitty gritties of the stated SPS dimensions, the five dimensions listed above were further divided into sub dimensions as shown below.
The results of the independents samples t-test comparing the mean responses of the two groups of Indian exporters and foreign importers stated that, among the 26 factors which the groups consider while preparing export consignment, the mean score of Indian exporters on types of standards like ‘food safety’ (M=4.92, SD=0.401) was statistically significantly higher (t=4.788, df= 107, p<.001) than those of foreign importers on the same variable (M=4.44, SD=0.975). Besides this, the mean scores of Indian exporters were significantly higher for the major factors like plant health (M=3.37, SD=0.800) and social (M=3.73, SD= 0.922).
On the contrary, the mean scores of foreign importers were significantly higher for the type of standards like product quality (M=3.89, SD=1.095) and quality control standards (M=3.22, SD=1.152).

Beside this, if different types of standards are further explored independently then it can be observed that under food safety standards, exporter’s perception on factors like traceability Requirements (M=4.03, SD=0.841) and limits on pesticides used (M=4.78, SD=0.722) was statistically significantly higher (t=10.336, p<.000 and t=8.069, p<.000) than that of foreign importers. While under the same standard, perception of foreign importers on factors like controls on food additives (M=3.21, SD=1.359) were statistically significantly higher (t=-2.789, p<.006) than that of Indian exporters.

The means of the two groups were not statistically significant for limits on microbiological pathogens; pack house/factory hygiene requirements, surveillance requirements etc. The remainder results of the t-test are displayed in the table 7.16. The analysis of results of independent samples t -test indicates that there are significant differences between the perceptions between Indian exporters of FFV and the foreign importers on various SPS dimensions. Next section further looks into these perceptions gaps between Indian exporter and importers across the three country groups individually.

7.7 Perception gap between Indian exporter and Individual Country groups

In order to capture individual differences and similarities between Indian exporters and independent sets of three country groups, same analysis as has been carried out above is extended to explore if this perception difference is prevalent among Indian exporters and importers of developed, developing and LDCs. It is also intended to explore whether the differences are statistically significant and if there was any variation in the perception of foreign importers based on their development status.
Highlights of the Perception Gaps (Table 7.17)

i. Mean score of Indian Exporters on types of standards like ‘food safety’ (M=4.92, SD=0.401) was statistically significantly higher (t=2.199, p<.032) than those of developed countries (M=4.6, SD=0.962) importers on the same variable.

ii. Mean scores of Indian exporters were significantly higher in the same variable for developing (M=4.38, SD=1.024, t=3.568, p=.001) and LDCs (M=4.21, SD=.885, t=3.552, p=.002) importers as well.

iii. Mean differences in the perceptions of Indian exporter on all types of standards is significantly different from developed country’s importer (p<0.05, in all five standards).

iv. In case of developing country it is less significant in case of Plant Health (p=0.87)

v. Mean difference is insignificant in case Product quality(p=0.349) and Quality Control (p=.63) for LDCs importer

Highlights of sub dimensions of SPS (Table 7.17)

i. Under food Safety standards, exporter’s perception on factors like Traceability Requirements (M=4.03, SD=0.841) and Limits on Pesticides used (M=4.78, SD=0.722)) was statistically significantly higher (t=8.66, p<.000 and t=5.061, p<.000) than that of Foreign importers of developed countries vis-à-vis developing and LDCs importer.

ii. While under the same standard, perception of foreign importers from developing and LDCs on factors like controls on food additives were statistically significantly higher (t=-2.236, p<.027 and t=-4.08, p=.000) than that of Indian exporters.

iii. The means of the different groups were not statistically significant for limits on microbiological pathogens etc.
The analysis of the perception gaps as summarized in tables below provides certain policy conclusions on individual SPS dimensions with respect to individual country groups.

**Food safety Standards**

The perception biasedness for food safety parameter for Indian exporter versus all the three group of countries needs to be checked. This is the result of the focus of the Indian food safety regulations on this issue. Indian exporters across products and regions are well aware on the clause on limits on pesticides use and considers is most important vis-a-vis other country groups. This absence of perception gap on pesticide issue with developing countries is indicative of similar situations prevailing in both the countries. For instance, in the Philippines, there are six regional laboratories capable of testing for pesticides but these are inadequate to cover the major regions of the country. Furthermore, the same situation as faced by India is noted: there are no MRLs established for many pesticides. In 2003 the Department of Agriculture analyzed 632 samples of 25 types of vegetable and four fruits. Sixteen percent were found to be positive for pesticide residues but only one percent exceeded established MRLs.

Similar was the case with Thailand. Under the Food Act of 1992, Thai regulation specifies that fresh fruits and vegetables must be free of chemical or microbiological contamination that could cause disease or health risks. However, the enforcement of the various rules and regulations tends to be weak at all levels. Consumer surveys in Thailand confirm the continued usage of banned pesticides either because old stocks are still available or because of illegal imports. Fruits and vegetables supplied under various safe vegetable schemes are often sold with high levels of pesticides. Many retail facilities continue to operate under unsafe conditions.

Literature surveys have reported that in Beijing twenty to thirty percent of fruits and vegetables were found to contain excessive levels of pesticides or heavy metals. Use of pesticides on cash crops such as cotton can contaminate fruits and vegetables grown on neighboring plots.
Methamidophos, a highly toxic pesticide used for tree crops, is often found in high levels in fruit and vegetables. This was similar to the case of fruits and vegetable originating from the states of Andhra Pradesh and Gujarat.

The existence of similar conditions within the developing countries depicted through statistically insignificant differences in mean values indicates a comfortable position for Indian exporters in the said markets on grounds of food safety on account of National treatment clause of WTO SPS agreement which prevents importing countries to restrict exports from other countries on grounds of SPS issues which are found existing in the national boundaries of the importing countries.

National treatment clause of WTO SPS agreement states that “Members shall ensure that their sanitary and phytosanitary measures do not arbitrarily or unjustifiably discriminate between Members where identical or similar conditions prevail, including between their own territory and that of other Members. Sanitary and phytosanitary measures shall not be applied in a manner which would constitute a disguised restriction on international trade”.

As with all other countries there appears to be very little testing for possible microbial contamination and therefore there is no statistically significant difference in the perception on microbiological pathogens.

Regarding control on food additives, Indian exporters are cautious on its usage while exporting to the developed markets (insignificant perception gap), while they need to be more cautious in their approach while exporting to the developing markets due to growing awareness on this parameter in developing countries of South East Asia and Middle east markets, depicted by statistically higher mean values.
Although Indian exporters are well aware of the hygiene requirements at factory and pack houses and are successfully clearing the audit checks made under BRC, SQF certifications, however, high cost of compliance towards getting this certificates, high audit costs and requirement of repeated renewals have limited the awareness and compliance of these certifications only to the large exporters as explained in the earlier chapters. Lower means values of these requirements as compared to the developed country consumers/importers reflect the predominance of the small and medium exporters as respondents. As of now there are only 6 HACCP certifying agencies accredited by APEDA to assist the exporters towards HACCP certification. The assistance therefore needs to be extended to the other voluntary standards including BRC, SQF, IFS etc. Further, Indian government should negotiate for Global Food Safety Initiative which would mean compliance to just one global standard instead of multiple individual country standards. Further there is no perception gap on this issue with developing countries. India needs to gear up to the emerging demands on traceability in both developing and developed markets.

(b) Plant Health

Indian exporters are at much comfortable position regarding their perceptions on the issues on plant health. This is proven by the fact that there is no statistically significant difference in perceptions on plant health with developing countries. Indian exporters considered this issue of high importance as compared with the consumers in the developed markets.
However, statistically significant lower mean values for Indian exporters vis-à-vis least developed country markets indicates relatively high priority extended by LDC on the plant health issues. This is specifically in cases like pest risk assessment wherein in countries like Myanmar, there are several acts regulating pesticide use and a Pesticide Registration Board (PRB) was established in 1992. Education and training in the safe handling of pesticides is provided by the Ministry of Agriculture and Irrigation. Another example that can be quoted in this context is small countries like Nepal, the Pesticide Act of 1991 and associated Rules of 1994 require the approximately 4 000 pesticide retailers to be registered. Retailers are required to undergo a two-day training course in order to obtain a licence and are issued with a booklet providing guidance on the most suitable pesticides for each crop. Each district has one Pesticide Inspector who is supposed to ensure the correct use of pesticides. Indian government can take learning from the regulations prevailing in these neighboring countries to enhance our capabilities towards pest risk assessment and management of pesticide usage.

(iii) Product Quality

In case of product quality, Indian exporters are required to pay more attention while exporting to both developed as well as developing markets. As of now, highest attention is being paid only on product cleanliness and colour. This is represented by statistically higher mean values for Indian exporters vis-à-vis importers across the three country groups. (Table 7.17)
Absence of grading standards will not be a concern while exporting to the developing countries since similar conditions prevail in these markets reflected by statistically insignificant mean values i.e., no perception gap. For instance, similar to AGMARK standards prevailing for 19 FFV in India, in Philippines also, grades and standards were formulated for twenty fruits and vegetables in 1963, but these have not been widely disseminated and have never been used by the private sector. New standards are under development, essentially following Codex standards and have been subject to public consultation. Again, it is unlikely that the domestic trade will adopt these voluntary standards.

However, the priorities of the developed country markets have been shifting from basic requirements of color and cleanliness to grading and standardization (high mean values for developed markets). Despite having AGMARK as an agency responsible for the grading of 19 fruits and vegetables in India, the grading is voluntary in nature and AGMARK certificates accompany the export consignments only in cases when demanded by the importing countries. Indian government needs to have policy focus towards development of facilities on mechanical grading, for instance, as of now there are only three states in India where mechanical grading for apples can be done. More over the possibilities of making AGMARK grading certificates as mandatory requirements should be considered.
(iv) Quality Control Standards

As indicated earlier, Indian exporters are complying towards private quality control standards including HACCP, GLOBALGAP and BRC. While consumers/importers in Bangladesh and Lao PDR were not even aware about these certifications resulting into statistically significant results biased for Indian exporters, consumers in both developing as well as developed country markets depicted higher statistically significant mean values indicative of higher importance given on this issue as compared to Indian exporters.

Rising awareness on HACCP certifications in developing countries is proven by the fact that establishments in Thailand are encouraged to become GMP certified and some of the more advanced are also HACCP certified. GMP certification is provided under a special program of the Ministry of Agriculture and Cooperatives. The Ministry also has a program underway to create a network between pack houses and GAP certified farms, involving inspection and sample testing from both farms and packing establishments. The Department of Agriculture has about 700 inspectors competent to certify farms as GAP compliant, although this is primarily for export production. Hygienic and sanitary practice codes for markets, retailers, restaurants and street food vendors are covered by the Public Health Act of 1992. India can take learnings from these examples to improve the implementation of the quality control standards.
(v) Social Standards

Two kinds of social standards are coming up in international market (i) labor standards and (ii) Fair Trade standards”. Indian exporters are cautious about labour standards, however, when interviewed; almost 65% of the respondents were unaware about the upcoming social standards on fair trade and SA- 8000.

Considering the Indian conditions, certain field level constraints were faced towards implementation of these social standards. For instance, “Sedex” which is an ethical audit from UK requires that farmers should be given one day leave. The farm owners could manage to extend this leave during off season, however, such requirements during peak season meant a huge business loss to them considering the high volatility of agricultural prices both in the domestic as well as international market. This situation becomes all the more critical in the absence of futures and options facilities for fruits and vegetable marketing in India. Indian Government should therefore look into promoting certain price risk instruments similar to the futures market on oranges in USA and other FFV in European countries.

Importers in Least developed countries were also unaware about the existence and growing importance of these standards in international markets and hence never demand it nor could rate the importance of these standards. Most of the respondents had mentioned “not applicable” against the ratings for these standards.
(vi) Other upcoming Standards

Amongst the upcoming standards were the identification and marking standards coming up in European countries and strict labeling standards across both developed as well as developing country markets. Exporters of fruits and vegetable in India were able to cope up with packaging requirements of South East Asia and Middle Eastern markets, however due to strict packaging requirements in developed markets of USA, Japan and EU, export opportunities were being lost. This is illustrated through case evidence 7.12.

![Table showing packaging and labeling standards](image)

**Case evidence 7.9: Loss of export opportunities in EU due to private packaging standards**

Tesco a big retail chain in UK has authorized only 4 companies to procure grapes from India. These four companies as per the understanding with Tesco has stated that these would buy grapes from Indian exporters only if the packaging material used for the purpose is “Punnets” used for quality packaging in domestic markets in of Greece and Spain. The reason given was that this is the only packaging material acknowledged by the conscious customers in European markets. The other option given to the Indian grape exporters was “INFIA” which again was the packing material being used widely in Italy. Not being able to withstand the high cost of this packaging material, most of the small grape exporters did not find the export business viable and lost the profitable export opportunities in these markets.
The analysis of the perception mapping between Indian exporters and the importers in three different group of countries i.e developed, developing and LDCs also bring out the fact that in most of the SPS dimensions, perceptions of the Indian exporters matched with that of least developed countries except for PRA and control on food additives where small countries like Nepal and Myanmar has taken the lead.

**Table 7.18: Areas of concern by Indian Policy makers: country wise analysis**

<table>
<thead>
<tr>
<th>SPS dimension</th>
<th>Developed</th>
<th>Developing</th>
<th>LDC</th>
</tr>
</thead>
<tbody>
<tr>
<td>Food Safety</td>
<td>Pack house hygiene req Traceability</td>
<td>Control on food Additives</td>
<td>Control on food Additives</td>
</tr>
<tr>
<td>Plant health</td>
<td>Sanitation</td>
<td>Sanitation</td>
<td>Pest Risk assessment</td>
</tr>
<tr>
<td>Product Quality</td>
<td>Grading</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Quality control</td>
<td>GLOBALGAP/BRC</td>
<td>HACCP/GMP</td>
<td>-</td>
</tr>
<tr>
<td>Social</td>
<td>Fair Trade</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Others</td>
<td>Packaging Labeling</td>
<td>Labeling</td>
<td>-</td>
</tr>
</tbody>
</table>

This was followed by perception matching with developing countries on issues like product quality, social standards and packaging standards. However, there were plethora of SPS dimensions that needs to be taken care off as summarized in the table above 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 (Annexure 7.4).

Last section describes some of the strategies executed by the 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.
7.8 Lessons learnt from other countries towards strengthening SPS compliance in India

In India multiple regulations for food have enacted at different points of time to supplement each other. This incremental approach has lead to incoherence and inconsistency in the food sector regulatory scenario. The food sector in India has been governed by a multiplicity of laws under different ministries. Multiplicity of laws creates confusion in the minds of consumers, traders, manufacturers and investors. The multiplicity of ministries and administering authorities at both the central and state level has resulted in a complex regulatory system that is not well integrated adding an additional burden on the food industry. In general, this regulatory system resulted in a lack of comprehensive, integrated food law under single regulatory authority that ensures public health, safety, and also specifies quality norms for meeting the globally recognized standards.

Second, most of these laws were formulated when the food processing industry was not so well organized. Also, there was no concept of genetically modified food. Given these developments, there is a need to update food laws to promote good manufacturing practices. The new legislation also seeks to introduce food safety systems.

A number of committees, including the Standing Committee of Parliament on Agriculture in its 12th Report submitted in April 2005, have emphasized the need for a single regulatory body and an integrated food law. To this effect, The Food Safety and Standard Act, 2006 consolidated eight laws governing the food sector and established the Food Safety and Standards Authority (FSSA) to regulate the sector. The Food Safety and Standards Act, 2006 aimed to integrate the food safety laws in the country in order to systematically and scientifically develop the food processing industry and paradigm shift from a regulatory regime to self-compliance.
The Food Safety and Standards Act, 2006 incorporates the salient provisions of the Prevention of Food Adulteration Act, 1954, and is based on international legislations, instrumentalities and Codex Alimentations Commission. This Act with its three tier structure (an apex food safety and standards authority, a central advisory committee and various scientific panel and committees) is expected to lay more emphasis on science based and participatory decisions while adopting the contemporary approach in both standard setting and implementation.

Understanding that the revamping of the Food Safety Management System in India is on cards, possible incorporation of certain learning from other developed and developing countries who are the competing suppliers of these FFV in the international market may further strengthen this system.

**National Programs for Food safety and Quality**

Competing suppliers of fruits and vegetables in international market have understood and are gearing up their food safety policies and national programs to cater to the growing consumer demands for better quality fruits and vegetables. In some countries, supermarkets are beginning to address this demand and there are special quality programs, such as “safe” vegetable program of Vietnam.

China has recently introduced several initiatives to promote safer food. Different labels are used for “green” food, “organic” food and “pollution-free” food. “Green” food is supposed to be non-polluted, safe, nutritious, and grown in a sustainable (e.g. minimal energy consumption) manner. Food meeting these standards can use an authentication symbol issued by one of 38 branches of the Green Food Development Centre. The Organic Food Distribution Centre (OFDC) in China was accredited by IFOAM\(^{10}\) in 2002. Prices obtained by organic products are said to be 50 percent higher than normal products while “green” produce commands a premium of around 10 - 20 percent. In addition to national programmes, several large cities in P.R. China are implementing their own programmes. Beijing, which hosted the

\(^{10}\) International Federation of Organic Agriculture Movements
Olympics in 2008, introduced the “Meat and Vegetable Quality Reassurance Project” in August 2002. The aim was to develop a “from farm to dining table” control system, involving producers in taking responsibility for product safety and leading to a “Green Olympics”. The program had reportedly been successful in reducing pesticide residues. Guangzhou has implemented a Food Quality Reassurance project. In 2001 Shanghai introduced “Standards for Safe and Hygienic High-Quality Vegetables” covering seed and land selection, fertilizer and pesticide use and quality monitoring. The aim of this program had been to move emphasis away from increasing the quantity of production to improving quality. However, standards are presently fairly low and production has yet to come up to “pollution-free” levels.

In Thailand, several farm-level accreditation schemes have been in operation. All emphasize control of pesticide residues and little attention is paid to microbial or other types of contamination. The “Pesticide Safe” vegetable program, run by the Department of Agriculture, involved inspection and crop testing. Farmers could still use pesticides and mineral fertilizers but products had to contain pesticide residues lower than the maximum level set by Codex Alimentarius.

The “Hygienic Vegetables” programme is promoted by the Medical Sciences Department. This places responsibility on the packer for sourcing vegetables with safe pesticide residue levels. Thailand has now developed the “Q Mark” with the objective of consolidating the various codes that presently exist. The system of Q standards covers different steps of the supply chain. Q GAP is for farm-level certification; Q-GMP is for packing plants; while QFood Safety (Q-GAP plus Q-GMP) is for packers sourcing only from farmers who are QGAP certified.

Following the major food safety problems in Viet Nam, the Ministry of Agriculture and Rural Development established temporary standards for “safe” vegetables. The criteria include nitrate and heavy metal content, pesticide residues, and the level of micro-organisms. Vegetables are also required to be harvested at the correct stage of maturity, not to contain foreign matter and to be suitably packed. “Safe”
vegetables have to be produced on farms certified by the Government. These must meet standards related to water quality, and fertilizer and pesticide use. Inspections are carried out periodically, with samples taken from markets, supermarkets and production areas.

Malaysia has introduced a commodity branding programme called “Malaysia’s Best.” This is an umbrella brand for the country’s horticultural products that guarantees quality and safety in accordance with Malaysian Standards and the Malaysian Good Agricultural Practice System. It was initiated for carambola, papaya, pineapple, mango and watermelon, but is to be extended to all other commodities. All farmers can apply to be certified although, initially, most certified farmers are contracted to the Federal Agricultural Marketing Authority (FAMA) for delivery to supermarkets.

In Indonesia, the Government has also responded to a lack of quality incentives in the marketing system by introducing commodity and location-specific certification systems. Prima III is the lowest standard, with produce required to meet MRLs. Prima II incorporates Prima III and quality attributes. Prima I broadly complies with EurepGAP standards.

Several countries have introduced IPM programs but these tend to be constrained by a lack of funds to reach and work with large numbers of smaller farmers, and the often limited skills and perhaps conflicting interests of extension workers. The Government of India adopted IPM as the main focus of plant protection in 1985. This has led to a decline in total pesticide sales but, as noted earlier, problems do persist since banned chemicals continue to be used and approved chemicals continue to be used to excess. India can take up the examples from smaller countries including Myanmar, wherein neem pesticide is produced by the Myanmar Agriculture Service and the extension service promotes this to vegetable farmers. In Myanmar, the Government uses radio program to educate food retailers about hygienic practices. P.D.R. Laos has a program of bio-fertilizer production and is promoting IPM.
Case 7.10: “KiwiGreen”- success story of IPM in New Zealand

The detection of spray residues on New Zealand kiwifruit, was essentially being used as a trade barrier in some European markets. The New Zealand Kiwifruit Marketing Board (NZKMB) responded in 1991 by developing a pest management strategy that would enable the production of fruit with no detectable residues. This IPM program, called ‘KiwiGreen’ focused on pest management and agrochemical issues, was launched in 1992. KiwiGreen’ is an example of the successful development and implementation of an IPM program across an entire fruit industry. ‘KiwiGreen’ consists of a documented and audited program of pest control measures that can only be applied in response to a demonstrable need. It was an important precursor to later developments when this program was broadened to encompass all the principles of IFP that became a major component within a broader GAP program called the ZESPRI™ System. This system was the basis of the EurepGAP implementation program in the kiwifruit sector in 2002 and today, over 90% of New Zealand’s kiwifruit producers that are EurepGAP certified supply crops to Zespri International Ltd.

Case 7.11: Good Agricultural Practices system in Taiwan: (Learning for BIS towards possible model for India GAP)

Food contamination such as the famous ‘cadmium rice’ detected in southern Taiwan and pollution began to emerge in the late 1980s. These safety issues raised public awareness on crop management systems. Thus, the main objective of crop production has turned into the elevation of safety and quality in the 1990s. The first GAP system was introduced in the early 1990s and the formal GAP logo certification system began to be implemented in 1994. The logo, in Chinese, is pronounced "Gee Yuan Pu," meaning fortune and good garden. The logo was formally registered in 1993 and patterned in 2003 by the Agricultural Chemicals and Toxic Substances Research Institute, which manages the logo certification system.
The objective of the original Taiwan GAP, a logo-certification system, was to ensure the safety of crop products, mainly fruits and vegetables. The certification is based on the principle of stake-sharing. Application is only open to farmer groups. All members of an applying farmer group are stakeholders sharing the responsibility of the group. The logo has only been issued to fruit or vegetable farmer groups so far. An applicant should submit documents of the following: 1) results of agrochemicals inspections; 2) records of attendance to workshops or training courses related to methods of agrochemical application; and 3) records of application of agrochemicals on their farms for at least the last three months.

All the recommended/standard culture and management processes for every fruit or vegetable crop are designed and modulated by the governmental district experimental station. Applicants should attend the training courses and follow instructions of extension specialists. District experimental stations have been designing standard operating processes for each fruit or vegetable crop. County government is responsible for issuing the certification and for controlling the amount of logo tags released to participant farmer groups. The Agricultural Chemicals and Toxic Substances Research Institute is responsible for the inspection and for the exchange of information among farmers, government offices and consumers, including the maintenance and updating of the official GAP Web site, http://www.tactri.gov.tw/. After the final review, certified farmer groups should sign a one-year contract with the county government. The contract may be renewed and continued every two years. Any non-compliance (or violation) with regulations can result in the suspension of the certificate and logo. Several contamination or pollution events may be charged by the government according to related laws.
Case 7.12: Concept of Navigation System for Appropriate Pesticide use in Japan

The Nouyaku-navi is a system aimed at actively guiding and supporting farmers’ correct use of pesticides in agricultural production in order to prevent in advance their misapplication. In the Nouyaku-navi, the goal is to enable farmers to prevent pesticide misapplication due to carelessness and to automatically register the application records by automatic recognition of the agrochemicals using bar-codes (Japanese Article Number codes) and/or RFID (Radio Frequency Identification: Wireless IC) tags attached to the agrochemical containers (Nanseki, Sugahara and Watanabe, 2004, Fig. 1, http://nouyaku-navi.info/). It is expected that using the Nouyaku-navi will achieve effects such as prevention of pesticide misapplication and of promotion of effective pesticide use and reduced pesticide farming. In addition, the Nouyaku-navi will accomplish the automatic and labor-saving collection and accumulation of objective data which supports pesticide application records.

A judgment server system has been developed (hereinafter referred to as the Nouyaku-navi judgment server) which determines in advance the propriety of pesticide use, together with a system for preparing appropriate plans or guidelines on pesticide application and pest control which can easily and precisely create such plans. An on-site warning system has been developed which uses barcodes or RFID to give farmers warning information and real-time judgments on the propriety of pesticides planned to be used, and an automatic recognition system of pesticide application which can accomplish a labor-saving and objective understanding of the state of pesticide application in farming fields. A system for risk assessment in individual cases of pest infestation/pesticide application corresponding to actual situations in production fields has been developed by accumulating information on pesticide application using mobile terminals and a pesticide automatic recognition system, and by using information on pest infestation collected by micro climate monitoring in the field and by automatic insect counters and others. Also, a system for assessing the risks of a pest infestation in terms of effective pesticide use or introduction of alternative materials has been developed by applying a data mining method on individual cases of pest infestation and pesticide application, as well as on a climate database.
Case 7.13: Application for Agricultural Methodological Analysis” (AFAMA)
Success story of Traceability System in Japan: Learning for APEDA

The Japanese people have become increasingly concerned about food safety problems. Thus, in order to guarantee safety, a food traceability scheme that discloses information about food production and distribution processes has to be established. Toward this end, the Japanese government, local governments and the Japan Agricultural Cooperatives (JA) have been promoting the development and practical application of food traceability systems (FTS) as national projects.

Several FTS based on information technology (IT) have been developed in recent years. The "Virtually Identified Produce System" (VIPS) is the basic scheme of FTS, where ID numbers are given to food products and printed on their labels or packages. Farmers input the production data about their products to an Internet-accessible database. Consumers who purchase these products can browse a product’s data by going to the VIPS Website and entering the product’s ID. Based on the VIPS, a practical information disclosure system called "SEICA" for fruit and vegetable products was developed and opened to the public in 2002.

Recently, a noncontact automatic identification technology, RFID (radio frequency identification), has shown promise for a more advanced and effective FTS. An integrated traceability system for agricultural products was developed to uniquely identify each product and store its information from production to consumption, applying an innovative technology of Web-based network computing, RFID and mobile phones. This system consists of three subsystems, as follows: production record system using Internet-enabled mobile phones; distribution record system using RFID tags and readers; and information disclosure system for consumers.

In Japan, mobile phones and Internet services are very popular among farmers. Thus a labor-saving and efficient system called "Farming Diary System" for managing the agricultural production process using Internet-enabled mobile phones was developed. As a commercialized adaptation of this system, Web application software, "Application For Agricultural Methodological Analysis" (AFAMA) was developed in 2002.
Table 7.6: Summary of problems in meeting SPS requirements identified in case studies

<table>
<thead>
<tr>
<th>Nature of Problem</th>
<th>Description</th>
</tr>
</thead>
</table>
| Access to compliance resources         | ➢ Technical expertise lacking  
➢ Lack of resources  
➢ Lack of trained personnel and laboratory facilities                                    |
| Compliance period                      | ➢ Delays in adaptation of competent authority to EU requirements  
➢ Periods too short  
➢ EU takes time to inspect  
➢ General Periods too short           |
| Nature of marketing chain              | ➢ Traceability required - huge problem for small-holders; capital investment required; reliability problems  
➢ Poor packaging and handling facilities;  
➢ Long distances to ports from production areas  
➢ Small-holder production; sun-dried - unripe product; no specialist drying |
| Production methods                     | ➢ Traditional growing and harvesting techniques  
➢ Transportation delays  
➢ EU takes little notice of local conditions  
➢ Humidity and rancidity; lack of scale  
➢ New CCC levels in grapes hard to meet |
| Logistical problems                    | ➢ Small producers - lack of airfreight capacity and bargaining power  
➢ Infrastructural rigidities and lack of cold storage  
➢ Lack of airfreight capacity, port and other facilities  
➢ Long-term contracts expected by US and European buyers.                                     |
| Access to information                  | ➢ Well established trade - customer requirements paramount  
➢ Difficult to get full information on SPS requirements  
➢ Stringent standards and inspections from UK buyers                                         |
| Awareness                              | Problems for small businesses to get information                                                                                               |
| Internal regulatory structure          | ➢ Poor Competent Authority  
➢ Many agencies responsible for SPS matters  
➢ Diversity of responsibility for SPS matters  
➢ Poor Competent Authority/poor inspection system  
➢ Poor credibility of Export Inspection agencies                                              |

Source: Author’s compilation (as reported by exporters)
### Table 7.8: Schemes by Government agencies on Logistics & Infrastructure development

<table>
<thead>
<tr>
<th>APEDA schemes</th>
<th>NHB schemes</th>
<th>MOFPI schemes</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Schemes for logistics development</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Assistance for purchase of specialized transport units for horticulture sector</td>
<td>Refer Van/Containers Sp. Transport Vehicles</td>
<td>Integrated Cold Chain infrastructure scheme of 11th Plan dry warehouses, cold chain infrastructure, including reefer vans, packaging unit</td>
</tr>
<tr>
<td><strong>Schemes for Infrastructure development</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Setting up of sheds for intermediate storage and grading/storage/cleaning operation of produce.</td>
<td>Grading /Washing/Shorting/Drying Packing Centers</td>
<td>cleaning, grading, sorting and packing facilities (including equipments)</td>
</tr>
<tr>
<td>Setting up of mechanized handling facilities including sorting, grading, washing, ripening, packaging &amp; palletisation etc.</td>
<td>Pre-cooling Units/Cool Stores</td>
<td>Ventilators, variable humidity stores, pre-cooling chambers, ripening chambers etc. (including equipments)</td>
</tr>
<tr>
<td>Setting up of both pre-cooling facilities with proper handling system as well as cold storage for storing</td>
<td>Radiation unit Dehydration unit</td>
<td>specialized storage facilities including Controlled Atmosphere Chambers, Pressure</td>
</tr>
<tr>
<td>Providing facilities for preshipment treatment such as fumigation, X-ray screening, hot water dip treatment, Water softening Plant</td>
<td>Vapor Heat Treatment unit.</td>
<td>irradiation facilities</td>
</tr>
<tr>
<td>Setting up of vapor heat (treatment, electronic beam processing or irradiation facilities</td>
<td>Primary processing of products fermentation, extraction, distillation, juice vending pulping, dressing, cutting, chopping etc</td>
<td></td>
</tr>
<tr>
<td>Setting up of specialized storage facilities such as high humidity cold storage deep freezers, controlled atmosphere (CA) or modified atmosphere (MA) storage etc.</td>
<td></td>
<td>Steam sterilization units, steam generating units, Food incubation cum development centers etc.</td>
</tr>
</tbody>
</table>

Source: Author’s compilation from government websites and interactions
### Table 7.10: Food safety legislations and concerned agencies in India

<table>
<thead>
<tr>
<th>Act</th>
<th>Year of Implementation</th>
<th>Objective</th>
<th>Concerned Ministry</th>
<th>Enforcement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prevention of Food Adulteration Act (PFA)</td>
<td>Enacted in 1954, which came into effect from June 1, 1955</td>
<td>Assuring the quality and safety of food as well as to encourage fair trade practices</td>
<td>Ministry of Health and Family Welfare (MOH&amp;FW) in the Central Government</td>
<td>Mandatory (Section 6 of the PFA Act, 1954, authorizes the custom collector to check the imported food products)</td>
</tr>
<tr>
<td>Essential Commodities Act</td>
<td>1955</td>
<td>Regulation of the manufacture, commerce and distribution of essential commodities, including food by laying stress on the quality and hygiene aspects of food.</td>
<td>Ministry of Consumer Affairs, Food and Public Distribution through the states/UTs</td>
<td>Voluntary</td>
</tr>
<tr>
<td>Fruit Products Order Control Orders under the provisions of the Essential Commodity Act</td>
<td>1955</td>
<td>It aims at regulating sanitary and hygienic conditions in the manufacture of food products.</td>
<td>Ministry of Food Processing Industries</td>
<td>Voluntary</td>
</tr>
<tr>
<td>Standards of Weight and Measures Act</td>
<td>1976</td>
<td>Govern the sale of packaged commodities in the country</td>
<td>Department of Consumer Affairs in the Ministry of Consumer Affairs, Food and Public Distribution.</td>
<td>Mandatory</td>
</tr>
<tr>
<td>Bureau of Indian Standards (BIS) Act (IS: 2814/1978 and IS: 3714/1978)</td>
<td>1986</td>
<td>It formulates the standards of processed food products</td>
<td>Mandatory only when demanded by importing countries (e.g. EU demands AGMARK certification in grapes)</td>
<td>Voluntary</td>
</tr>
<tr>
<td>Agricultural Produce (Grading and Marking) Act, as Amended in (AGMARK)</td>
<td>1937, 1986</td>
<td>It provides for the promotion of the standardization and grading for agricultural food commodities by pre-testing and certification under the General Grading and Marking Rules, 1986 and 1988</td>
<td>Directorate of Marketing and Inspection (DMI) under the Ministry of Agriculture.</td>
<td>Voluntary</td>
</tr>
<tr>
<td>Export (Quality Control and Inspection) Act</td>
<td>1963</td>
<td>Puts into place a system of certification covering product and systems aspects, in line with international requirements</td>
<td>Ministry of Commerce and Industry through Export Inspection Council (EIC) and the five Export Inspection Agencies (EIA) functioning under the Council.</td>
<td>Voluntary</td>
</tr>
</tbody>
</table>

Source: Author’s compilation
Table 7.12: Government Schemes addressing constraints towards SPS compliance

<table>
<thead>
<tr>
<th>Constraint faced by firm towards SPS compliance</th>
<th>APEDA schemes</th>
<th>NHB schemes</th>
<th>MOFPI schemes</th>
</tr>
</thead>
</table>
| Inadequate testing and inspection facilities  | - Assistance to exporters, producers, trade associations, public institutions etc. for setting up / strengthening laboratories  
- Upgradation and recognition of labs for export testing  
- Testing of water, soil residues of pesticide, veterinary drugs, hormones, toxins contaminants in agricultural produce / products | none | - Setting up / upgradation of quality control / food testing laboratories.  
- Testing laboratory (including equipments) under Central Processing Centers of Mega Food Park Scheme |
| Inadequate trained manpower                   | - Assistance to growers and manufacture, exporter & export related organization for upgradation of technical and managerial personnel through training in India, excluding the cost of travel.  
- Assistance to recognized associations of growers/exporters for organizing seminars/group activities including study tour within the country and for bringing out information literature.  
- Assistance program for study tour sponsored or organized by APEDA abroad | | |
| Inadequate standards and regulations          | Standardization and quality control such as preparation of quality assurance manuals, guidelines, documents, standards, upgradation and recognition of labs for export testing, certifying exporters as Premium Quality Exporters etc. pesticide management program, national and international standardization activities | none | |
| Inadequate processing technologies            | | Introduction of New Technologies | MEGA FOOD PARKS SCHEME |
7.14: Multiple Comparisons on perception mapping between export markets (Tukey HSD)

<table>
<thead>
<tr>
<th>Dependent Variable</th>
<th>(I) Country</th>
<th>(J) Country</th>
<th>Mean Difference (I-J)</th>
<th>Std. Error</th>
<th>Sig.</th>
<th>95% Confidence Interval</th>
<th>Lower Bound</th>
<th>Upper Bound</th>
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<tr>
<td>Food Safety</td>
<td>Developed</td>
<td>Developed</td>
<td>0.229</td>
<td>0.198</td>
<td>0.483</td>
<td>-0.24</td>
<td>0.7</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>LDC</td>
<td>0.394</td>
<td>0.264</td>
<td>0.298</td>
<td>-0.23</td>
<td>1.02</td>
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<td>LDC</td>
<td>-0.229</td>
<td>0.198</td>
<td>0.483</td>
<td>-0.7</td>
<td>0.24</td>
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<td></td>
<td></td>
<td>LDC</td>
<td>0.164</td>
<td>0.264</td>
<td>0.807</td>
<td>-0.46</td>
<td>0.79</td>
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<td>LDC</td>
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<td>-0.394</td>
<td>0.264</td>
<td>0.298</td>
<td>-1.02</td>
<td>0.23</td>
<td></td>
</tr>
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<td>LDC</td>
<td>Developing</td>
<td>-0.164</td>
<td>0.264</td>
<td>0.807</td>
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<td>0.46</td>
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<td>1.91</td>
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<td>0.001</td>
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<td>-0.36</td>
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<td>-0.78</td>
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<td>LDC</td>
<td>.950*</td>
<td>0.248</td>
<td>0.001</td>
<td>0.36</td>
<td>1.54</td>
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<tr>
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<td>0.328</td>
<td>0.152</td>
<td>-1.39</td>
<td>0.17</td>
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<td>0.78</td>
<td>2.35</td>
<td></td>
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<tr>
<td></td>
<td>LDC</td>
<td>Developing</td>
<td>0.614</td>
<td>0.328</td>
<td>0.152</td>
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<td>1.39</td>
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<td>0.005</td>
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<td>0.85</td>
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<td>Developing</td>
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<td>0.297</td>
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<tr>
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<td>LDC</td>
<td>Developing</td>
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<td>0.307</td>
<td>0.242</td>
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<td>0.308</td>
<td>0.005</td>
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<td>0.308</td>
<td>0.005</td>
<td>-1.71</td>
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*The mean difference is significant at the 0.05 level.
Table 7.15: Analysis of Differences in Perceptions across Developed, Developing and LDC: One way ANOVA test results

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<tr>
<th>Plant health</th>
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<tr>
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</tr>
<tr>
<td>Tukey HSDa</td>
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</tr>
<tr>
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<tr>
<td></td>
<td>LDC</td>
</tr>
<tr>
<td>Sig.</td>
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</tr>
<tr>
<td>Tukey Ba</td>
<td>Developed</td>
</tr>
<tr>
<td></td>
<td>Developing</td>
</tr>
<tr>
<td></td>
<td>LDC</td>
</tr>
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</table>

Means for groups in homogeneous subsets are displayed.

<table>
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<tr>
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<th>Subset for alpha = 0.05</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Country</td>
</tr>
<tr>
<td>Tukey HSDa</td>
<td>LDC</td>
</tr>
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<td></td>
<td>Developing</td>
</tr>
<tr>
<td>Sig.</td>
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<td>Tukey Ba</td>
<td>LDC</td>
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Means for groups in homogeneous subsets are displayed.

<table>
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<tr>
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<th>Subset for alpha = 0.05</th>
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</thead>
<tbody>
<tr>
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<td>Country</td>
</tr>
<tr>
<td>Tukey HSDa</td>
<td>LDC</td>
</tr>
<tr>
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<td>Developed</td>
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<td></td>
<td>Developing</td>
</tr>
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<td>Sig.</td>
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<tr>
<td>Tukey Ba</td>
<td>LDC</td>
</tr>
<tr>
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</tr>
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<td>Developing</td>
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Means for groups in homogeneous subsets are displayed.

<table>
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<th>Subset for alpha = 0.05</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>Country</td>
</tr>
<tr>
<td>Tukey HSDa</td>
<td>LDC</td>
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<td>Sig.</td>
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<td>Tukey Ba</td>
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<tr>
<td></td>
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</tr>
<tr>
<td></td>
<td>Developing</td>
</tr>
</tbody>
</table>

Means for groups in homogeneous subsets are displayed.
a. Uses Harmonic Mean Sample Size = 30.572

Note: no statistically significant difference between perceptions of three groups on Food safety, hence not considered
Table 7.16: Independent sample t-test results on perception gap between Indian exporter & Foreign importers

<table>
<thead>
<tr>
<th>Factors</th>
<th>Indian Exporter Mean</th>
<th>Indian Exporter Std. Deviation</th>
<th>Foreign Importer Mean</th>
<th>Foreign Importer Std. Deviation</th>
<th>t</th>
<th>sig.</th>
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<td>Types of Standard</td>
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<td></td>
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<td></td>
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<td>Food Safety</td>
<td>4.92</td>
<td>0.401</td>
<td>4.44</td>
<td>0.975</td>
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<td>1.417</td>
<td>3.89</td>
<td>1.095</td>
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<td>Quality Control Standards</td>
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<td>1.546</td>
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<td>Limits on pesticide use and residues</td>
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<tr>
<td></td>
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<td>Mean</td>
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Table 7.17: Perception Variation btwn Indian exporter and Developed/developing/LDC importers: results of independent samples t-test
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<th>Developing Country importer</th>
<th>Developed Country importer</th>
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<td>4.67</td>
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</table>
Annexure 7.1

Prevalent Supply Chain Models for Fruits and vegetables in India

i. Vertically integrated supply chains

Importers or multinationals that control most of the fruit and vegetable supply chain activities (production, export, and distribution) operate in a vertically integrated supply chain. These companies also are called transnational companies. Food safety and quality issues can be controlled and monitored well since the different chain activities are under the responsibility of one corporation. The safety and quality of the products is, therefore, very high. Most of these companies cultivate products of top quality. Some companies even guarantee quality in a private label. To avoid the food safety and quality requirements of differing private retail standards (different registration systems), most companies have developed their own private food safety and quality specifications that exceed most of the private retail requirements. They train their staff to conduct specific handling and to conduct quality inspections. The companies are in close contact with the foreign buyers.

(ii) Collaborative supply chain: success story example of MAHAGRAPES

Within the collaborative supply chain, the chain partners are in close contact with one another. The major European supermarkets have established long-term relationships with a limited number of large-scale importers for the supply of fresh fruits and vegetables. Some importers have even obtained exclusive trade relations. The importers have adjusted their organizational structures to match the retailer’s demand. They source fresh produce from preferred producers from different countries, including many developing countries. The retailer communicates his specific requirements regarding food safety and quality to the importer and the producers. The importer also informs the producers about the public food safety (such as phytosanitary
and MRL regulations) and quality requirements, (such as grading and packaging requirements) of the importing country and the specific demands of the retailer. To control and monitor the quality and safety of the products, the importer visits the producer on a periodic basis, often together with the quality manager of the retailer; sends product samples to the laboratory (once or twice a year per product per supplier); and samples the visual quality of each shipment. Some importers audit the farms of the producers according to the retailer’s specifications. The retailer checks only the quality of the products briefly at arrival, in the distribution centers, and in the stores; and sends samples to the laboratory on a periodic basis.

(iii) Transaction-oriented supply chains

Approximately 80 percent of small-scale producers in India are still involved in transaction-oriented supply chains. These producers often sell their products without knowing the final market destination. Local traders, cooperatives, and large-scale producers buy the products of these producers at the farm gate and export the products to various countries and thereafter facing rejections due to variations in standards. In many cases, these products are sold to various outlets such as supermarkets, wholesalers, specialist shops, or traders who re-export the products in fresh or semi-processed form. In this supply chain type, collaboration of chain partners is limited to transaction processes; therefore, information related to food safety and quality is hardly communicated. As a result, producers often are not aware of public and private requirements and, therefore, risk noncompliance with these requirements.
Annexure 7.2

Developments in Pesticides Legislations in major Export Markets

This Annex summarizes relevant developments in pesticides legislation in the European Union, Japan and the United States.

Developments in EU legislation

In the European Union, a basic principle of Directive 91/414/EEC of July 1991 is the development of a positive list of active substances in plant protection products that are acceptable for the environment, human and animal health. The harmonisation process has two elements: (a) the review of active substances and (b) setting of harmonised EU MRLs for crop/chemical combinations for substances. An ambitious review process is under way during which each applicant (e.g. a chemical company) has to prove that a substance can be used safely regarding human health, the environment, eco-toxicology and residues in the food chain, based on scientific assessments set out in the Directive. The regulations classify fruit and vegetables into 126 different products, with 823 active substances to be considered, this makes a total of 103,698 MRLs to be harmonised throughout the EU.

MRLs for prohibited substances and for products for which no specific MRL is established will be set by default at 0.01 mg/kg. Where an MRL or approval for use of an active substance for crops grown in Europe does not exist, applications for MRLs for imported produce grown outside the EU may result in the granting of "Import Tolerances" for those specific crop/chemical combinations.
Developments in legislation in Japan

With the amendment of the Food Sanitation in 2003, Japan has also adopted a “positive list” system with MRLs for specific pesticides. If a residue exceeds the maximum limit, or if a product contains a pesticide for which there is no specified MRL, the product cannot be imported into Japan. In May 2005, the Ministry of Health, Labour and Welfare (MHLW) notified the final draft of thousands of new provisional MRLs for over 700 pesticides. In November 2005, MHLW announced a 6-month transitional period before the new MRLs would be implemented as of May 2006. The legislation calls for a transition period, which MHLW said would probably last until 2006. The impact of the Food Sanitation Law greatly depended on the way it is implemented. MRL levels for pesticides included in the positive list are likely to become lower than current levels, implying stricter requirements.

Developments in legislation in USA

In the United States, pesticides found on produce must have been registered with the United States Environmental Protection Agency (EPA) for use on that particular crop. A pesticide cannot be legally used in the United States if it has not been registered with EPA’s Office of Pesticide Programs. Pesticide registration may be long and expensive. A process of re-registration for older agrochemicals was instituted more than a decade ago under the Federal Insecticide, Fungicide, and Rodenticide (FIFRA). In this process, many uses of well-known agrochemicals for minor crops (which would include several categories of FFV) would have been lost. While a more streamlined and less expensive minor use (Integrated Research Project Nr. 4 or IR-4 Program) registration process was later established, many agrochemicals viewed as crucial for imported specialty products in particular have still not reregistered for those uses. These changes in registration could have led to problems of pesticide-related detention or rejection for some of the products of interest in the context of this note. Recognizing the issues with minor uses especially, in 2003 Congress passed the Pesticide Registration Improvement Act (PRIA), which became effective on 23 March 2004. Its goal is to create a more predictable evaluation process for affected pesticide decisions.
Annexure 7.3

Schemes extended by Government Agencies towards SPS compliance

a. APEDA

Schemes for Quality Development

<table>
<thead>
<tr>
<th>Components</th>
<th>Scale of Assistance</th>
</tr>
</thead>
<tbody>
<tr>
<td>(A) i) Assistance to exporters, producers, trade associations, public institutions etc. for setting up / strengthening laboratories.</td>
<td>50% of the total cost subject to a ceiling of Rs.5 lakhs per beneficiary.</td>
</tr>
<tr>
<td>ii) Assistance to exporters &amp; producers for installing quality management, quality assurance and quality control system such as ISO series, HACCP, TQM etc. including consultancy, quality improvement and certification for these.</td>
<td>50% of the cost subject to a ceiling of Rs.2 lakhs per beneficiary for each system</td>
</tr>
<tr>
<td>iii) Activities related to standardization and quality control such as preparation of quality assurance manuals, guidelines, documents, standards, upgradation and recognition of labs for export testing, certifying exporters as Premium Quality Exporters etc. pesticide management program, national and international standardization activities.</td>
<td>100% internal scheme of APEDA.</td>
</tr>
<tr>
<td>iv) Upgradation and recognition of labs for export testing.</td>
<td>For upgradation upto 50% of cost for private labs and upto 100% of the cost for Central / State Government / University laboratories subject to a maximum of Rs.50 lakhs.</td>
</tr>
<tr>
<td>v) Testing of water, soil residues of pesticide, veterinary drugs, hormones, toxins contaminants in agricultural produce / products.</td>
<td>50% of the cost of tests subject to a ceiling of Rs.2000 per sample. Payment shall be made direct to laboratories and not to individual exporter.</td>
</tr>
</tbody>
</table>
| (B) (i) Assistance to growers and manufacture, exporter & export related organisation for upgradation of technical and managerial personnel through training in india, excluding the cost of travel. | i. 50% of the cost of approved training programme subject to Rs 50,000 per beneficiary. Assistance shellbe given only for training undergone in the institutes on the panel of APEDA. The payment shall be made direct to the institute. The eligibility will be limited to once during the plan period.  
   ii. 100% of organised by APEDA. |
(ii) Assistance to recognized associations of growers/exporters for organising seminars/group activities including study tour within the country and for bringing out information literature.

50% percent of the cost of the seminar/workshop etc. subject to a ceiling of Rs. 1 lakh for national seminar and Rs. 2 lakh for international seminars. For information literature, the assistance shall be 50% of the cost subject to a ceiling of Rs. 25,000. Assistance shall be available only to such seminar witch have been approved by APEDA in advance.

(iii) Seminars organized by APEDA.

100% if organized by APEDA

(iv) Assistance programme for study tour sponsored or organized by APEDA abroad. the assistance would be restricted to such activities that have correlation with exports.

50% of the total cost of travel and distribution of study material.

### Schemes for Infrastructure Development

<table>
<thead>
<tr>
<th>COMPONENTS</th>
<th>SCALE OF ASSISTANCE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Establishment of common infrastructure facilities by APEDA or any other Government or Public Sector agency like Airport Authority of India or Port Trust etc.</td>
<td>100% grant-in-aid</td>
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<tr>
<td>A) Assistance for purchase of specialized transport units for animal products horticulture and floriculture sector.</td>
<td>25% of the cost subject to a ceiling of Rs. 2.50 lakhs per beneficiary.</td>
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<tr>
<td>B) Assistance exporters/producers/growers/Cooperative organization and federations for horticulture and floriculture sector for</td>
<td></td>
</tr>
<tr>
<td>i) Mechanization of harvest operation of the produce.</td>
<td>25% of the cost subject to a ceiling of Rs. 5.00 lakhs per beneficiary</td>
</tr>
<tr>
<td>ii) Setting up of sheds for intermediate storage and grading/storage/cleaning operation of produce.</td>
<td>25% of the cost of equipment subject to a ceiling of Rs. 5.00 lakhs per beneficiary</td>
</tr>
<tr>
<td>iii) a) Setting up of mechanized handling facilities including sorting, grading, washing, waxing, ripening, packaging &amp; palletisation etc.</td>
<td>25% of the cost of equipment subject to a ceiling of Rs. 10.00 lakhs per beneficiary</td>
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<tr>
<td>b) Setting up of both pre-cooling facilities with proper handling system as well as cold storage for storing.</td>
<td>25% of the cost of equipment subject to a ceiling of Rs. 10.00 lakhs per beneficiary</td>
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<tr>
<td>c) Providing facilities for preshipment treatment such as fumigation, X-ray screening, hot water dip treatment, Water softening Plant</td>
<td>25% of the cost of equipment subject to a ceiling of Rs. 10.00 lakhs per beneficiary</td>
</tr>
</tbody>
</table>
b. NHB Schemes

PHM/Primary processing related

1. Grading /Washing/Shorting/Drying Packing Centers
2. Pre-cooling Units/Cool Stores
3. Refer Van/Containers
4. Sp. Transport Vehicles
5. Retail Outlets
6. Auction Plateform
7. Ripening curing Chamber
8. Market yard/rope ways
9. Radiation unit Dehydration unit
11. Primary processing of products fermentation, extraction, distillation, juice vending pulping, dressing, cutting, chopping etc.
12. Horti. Ancilliary industry e.g. tools equipment plastics, packing etc.
13. Carttones, Aseptic packing & Nets (50% subsid)

Pattern of assistance

Back-ended capital investment subsidy not exceeding 20% of the project cost with a maximum limit of Rs. 25 lakh per Project. (Rs. 30 lakhs for North East/ Trival Areas) of Production Post Harvest Management and Primary processing of the horticulture Produce.
Annexure 7.4: Dominance of Developing and Least developed markets as export destinations for Indian FFV

<table>
<thead>
<tr>
<th>Mangoes fresh</th>
<th>1995</th>
<th>1997</th>
<th>1999</th>
<th>2001</th>
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<th>2005</th>
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Source: CMIE, Agriculture, 2010