

FAO Subregional training workshop in Asia and the Pacific

Improving the Quality and Safety of Fresh Fruits and Vegetables: A Practical Approach

Organized by
Food and Agricultural Organization of the United Nations (FAO)
in collaboration with
National Institute of Nutrition (NIN), India

Hyderabad, India, 4 to 8 February, 2008



Acknowledgement

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WORKSHOP REPORT

1. Background

The FAO Regional Office for Asia and the Pacific (RAP) and the Food Quality and Standards Service (AGNS) of FAO Headquarters in collaboration with National Institute of Nutrition (NIN), Hyderabad, India organized from 4 to 8 February 2008 a subregional training workshop on improving the quality and safety of fresh fruits and vegetables: A practical approach. The workshop took place in the National Institute of Nutrition, Hyderabad, India.

The workshop was part of a series of workshops throughout the world at international, regional, subregional and national levels utilizing the training manual “Improving the quality and safety of fresh fruits and vegetables: a practical approach” that has been developed by AGNS for the Prevention of Food Loss (PFL) programme (ftp://ftp.fao.org/es/esn/food/manualfruits_en.pdf) with an interactive CD with training tools (http://www.fao.org/ag/agn/CDfruits_en/launch.html).

The general objective of the workshop was to train professional staff, as “trainers”, on the principles and practices necessary to ensure the safety and quality of fresh fruits and vegetables, with emphasis on the prevention and control of microbiological and chemical hazards by applying GAP, GMP, and a HACCP based approaches to primary production.

2. Participants and facilitators

The workshop was attended by 25 participants from 9 countries namely: Bangladesh, Bhutan, Cambodia, India, Lao PDR, Maldives, Myanmar, Nepal and Sri Lanka. Regional participants were selected through a transparent process which the concerned Ministries in each of the participating countries, via the FAO Representatives, nominated national experts to attend the workshop. The candidates were selected according to their involvement in public policies, standards and regulations for fresh fruits and vegetables, extension service, capacity building activities and certification related to the quality and safety of fruits and vegetables. Participants from Ministries, research institutions, training centres, trader organisations and universities attended the workshop.

The facilitators and lecturers consisted of the following persons:

- Maya Pineiro, Senior Officer, Food Quality and Standards Service, FAO Headquarters
- Peter Sousa Hoejskov, Associate Professional Officer, FAO Regional Office for Asia and the Pacific (RAP)
- Masami Takeuchi, Associate Professional Officer, Food Quality and Standards Service, FAO Headquarters
- Wilfried Schnitzler, International Consultant, Germany
- Pitam Chandra, National Consultant, India
- Kalpagam Polasa, National Institute of Nutrition, India
- V. Sudershan Rao, National Institute of Nutrition, India

The complete list of participants is attached as Annex 1.

3. Material provided to the participants

Prior to the workshop the participants received a background paper, tentative timetable, logistical note and a pre-workshop questionnaire. The purpose of the pre-workshop questionnaire was to collect information about the participants' expectations to the workshop, the economic and social importance of the horticultural sector in their countries and country institutional capacities for safety and quality in horticulture. Not all participants returned the questionnaire prior to the workshop and only very few answered part B and C of the questionnaire.

On the first day of the workshop all participants received a hardcopy and CD-Rom of the manual for trainers "Improving the quality and safety of fresh fruits and vegetables: a practical approach". The CD-Rom "Fresh Fruit and Vegetable Quality and Safety Database" was also provided to the participants.

At the end of the workshop the participants received a CD with the presentations delivered by NIN, photos taken during the workshop, presentations delivered by Mr Rao during the field visits and other relevant material.

4. Methodology and workshop proceedings

The workshop methodology was based on a practical approach, consisting of lectures, group discussions, illustration of case studies and field visits. Time was provided for discussions and for developing national action plans. Presentations, group discussions and plenary sessions were all conducted in English. The detailed programme of the workshop is attached in Annex 2.

The workshop was officially opened with speeches given by Dr B. Sesikeran, Director, NIN and Dr. Maya Pineiro, Senior Officer, Food Quality and Standards Service (AGNS), FAO. Dr Sesikeran highlighted the importance of the topic of improving quality and safety of fresh produce in the context of India and the Asia-Pacific region. On behalf of FAO, Dr Pineiro thanked NIN and the facilitators for organizing the workshop and for their technical contributions to the programme. She pointed out that the workshop was the ninth among a series of workshops being carried out by FAO to improve the quality and safety of fresh fruit and vegetables and highlighted that successful implementation of quality and safety programmes in the horticultural sector requires "Collective Actions" and integration of private and public efforts.

Section I

Dr Pineiro presented the background of the project and the workshop and the workshop's overall objectives. Dr Masami Takeuchi, FAO/AGNS, presented the overview of the workshop including the main and specific objectives, course methodology, expected outcomes, programme of the workshop as well as the training materials (manual and CD).

Section II

Each participant introduced themselves in their individual roles in fresh produce chain and explained how their institutions are involved in the fresh produces' quality and safety control system in their countries.

Dr Pitam Chandra, FAO National Consultant, presented a paper with an overview on opportunities and challenges of the Asian horticultural sector. He highlighted that Asia has the highest production and largest fresh fruit and vegetable consumption in the world but the lowest export volume. He also pointed out some of the concerns related to improving the quality and safety of fresh fruits and vegetables as being lack of exportable varieties, lack of post-harvest treatment facilities, lack of packinghouses, high costs for obtaining quality and safety certification, uneconomic scale of operation, lack of consistency in supply and lack of technical support to the agro-industrial sector. He stressed that strengthening the linkages among all the key stakeholders including farmers, processors, regulators, markets and consumers by setting-up appropriate inspection and testing infrastructure, branding and grading technologies related to international requirements, would be critically important for the sector to prevent post-harvest losses and to improve quality and safety of fresh produce.

Dr Kalpagam Polasa and Dr Sudershan Rao, NIN, provided an up-to-date picture of the Indian fresh fruits and vegetable sector based on a recent comprehensive survey carried out by the World Bank. The presentation pointed out that the industry makes large efforts and is working into a rapidly growing market. Production by itself seems to be not much of concern but there are serious problems in infrastructure and logistics, in terms of properly functioning trade channels from the producer to the markets (domestic and international) as well as poor post-harvest handling and packing facilities leading to measurable post harvest losses.

During the discussion, participants exchanged their ideas of safety and quality improvement in the international market, however it was also agreed that it is important not to perceive quality of fresh fruits and vegetables only as an issue of export, but also a concern for domestic consumption. Quality including 'Safety and Assurance' must apply indiscriminately. The judgement of quality standards may be subject to demands of a country, its culture, ethnic groups, etc.

Mr Peter Sousa Hoejskov, FAORAP gave an introduction to FAO's capacity building activities in Asia and the Pacific in the area of food quality and safety in general and activities related to fresh fruits and vegetables in particular.

Section III

The presentation on "The Concept of Quality Applied to Fresh Fruits and Vegetables" was delivered by Dr Wilfried Schnitzler, FAO International Consultant, and formed the basis for the following working group session. During the working group session the participants were divided in three groups in order to discuss the concept of food quality from the point of view of different stakeholders in the supply chain for fruits and vegetables. The concept was discussed with regard to fresh grapes.

In the following plenary session each group presented their results. Each group had a basic but clear understanding of the needed quality inputs from the point of view of different stakeholders including producers, traders, consumers and support institutions. All pointed out correctly that the choice of cultivars/varieties will be essential for all actors within the chain but that the various players have different demands to meet their goals. The points which the three groups formulated were pretty much identical. Although, none of them mentioned 1) the importance of packing and transport; 2) the need for high marketable recovery of harvested produce to remain on a competitive edge; 3) the demand of staple supply and availability of goods in the market place and 4) the opportunities related to branding and

labelling of fresh fruits and vegetables. It was also emphasized during the discussion that the market for high quality of fresh fruits and vegetables is driven by consumers' demand rather than producers supply.

Section III was continued with presentation 3.2 "Maintaining the Quality and Safety of Fruits and Vegetables throughout the Post-harvest Chain" delivered by Dr Schnitzler. The audience's interest in this subject reflected the active discussion in the following plenary session.

The participants split into three working groups to discuss "National Importance of Post Harvest of fresh fruits and vegetables" based on the earlier presentation and as set by a questionnaire on page 3-17 in the provided Manual for Trainers.

Each working group chose one fruit cultivar to base their analysis upon. The cultivars chosen were mango, banana and guava. Positive facts as well as difficulties were identified, on the subjects of 1) "Post harvest infrastructure", 2) "Research and Technological developments in post harvest", 3) "Availability and access to technological information on post harvest", 4) "Training and technical support programmes", 5) "Governmental programmes and policies to address post harvest issues" and 5) "Understanding by the actors of the importance of appropriate logistics and post harvest handling to assure quality and safety of fresh produce". The summary of a general common consensus by the three groups is as follows:

Post harvest infrastructure is in many cases poorly developed in the region, improvements are costly and the farmers are poor. Generally, the vendor system is good. There is insufficient research on shelf life of fresh fruits and vegetables and there are too many varieties. Access to technology is costly, farmers have little access to it and their illiteracy is a strong obstacle. Training materials are few and often too complicated to understand. The necessity of post harvest treatment is recognized but lack of funding reflects the poor support to horticultural programmes. The various actors in the fresh fruits and vegetables chain place different emphasis on the matter of post harvest. This is proven by the uncoordinated action to improve fresh fruits and vegetables by post harvest treatments.

Section III was completed by a video presentation delivered by NIN. The presentation highlighted a study on the national programme to monitor pesticides applied in grapes that has been initiated in India. The objective of the project was to improve the reputation that Indian grapes have on the export markets with special attention to pesticide residue limits exceeding the requirements on import markets. The study showed that as a result of the monitoring programme the unwanted high residues dropped for exported grapes from 25 percent to 7 percent within five years. With these encouraging results, the government plans to extent this programme to also cover mango exports. Unfortunately, this programme is not being extended to cover fresh fruits and vegetables meant for the domestic market.

Section IV

Section IV of the workshop dealt with applying food safety principles during the production and post harvest fresh fruits and vegetable chain.

The section started with a presentation by Dr Takeuchi regarding the importance of food safety in horticulture including implications for demand and trade. This presentation was followed by a presentation by Mr Rao who gave details on the Indian food regulations.

Dr Pineiro presented the Codex Alimentarius, its structure, mandate, objectives, main work areas, relationship to WTO and in particular the quality and safety standards, codes of practice and recommendations related to fresh fruits and vegetables. This opened a lively discussion as many participants were concerned that Codex standards would be mandatory, applied to all countries worldwide and cause trade barriers. It was clarified that Codex standards are voluntary and countries need to introduce them in their legislation in order to be mandatory and also that, according to the SPS Agreement, countries are allowed to apply different SPS measures provided they are scientifically based with appropriately justified risk assessment data.

The main part of section IV dealt with the application of programmes for safety assurance of fresh fruits and vegetables. The managerial tools and pre-requisite programmes GAP, GMP, GHP and SOPs were introduced and discussed. The first three programmes are necessary to know “what to do” the SOPs are needed for “how to do it”.

The following discussion in the plenary concentrated mainly on GAP and whether this concept could be implemented nationwide. The participants recognised that GAP should be applied as a means to assure food quality and safety. However, application of GAP should not be an objective in itself rather should the actual quality and safety of the final product be in focus. The participants also built the consensus that to reach the desired quality standards for fresh fruits and vegetables, GAP must always be tailored according to national circumstances and consumer habits. The drivers for applying pre-requisite programmes were also discussed and it was a common perception that export markets requirements in general and private quality and safety assurance schemes such as GLOBALGAP in particular are the main drivers. The main barriers and constraints related to the development and implementation of pre-requisite programmes include lack of extension capacity, lack of government commitment, weak control of the use of agricultural inputs, difficulties in setting up farmers groups and cooperatives and high level of illiteracy among farmers. Despite of the difficulties the discussion showed that a number of countries in Asia have developed or are developing national guidelines for GAP, GMP, GHP and SOPs.

The discussion was followed-up by a presentation by Dr Chandra on HACCP in post-harvest handling of fresh fruits and vegetables. The presentation was complemented by a working group session consisting of an exercise on the HACCP system for post-harvest handling of different fruits and vegetables. Flow diagrams and theoretical CCPs were drawn out to practice the understanding of critical control points for the practical observations during the following day’s field visits. At the end of the day, briefing on the field trip was provided by NIN.

Field visits

Prior to the departure for field visits each participant received handouts (Material 4.9) in order for them to note observations related to production and post-harvest handling practices at the farms and packinghouses visited. In collaboration with the State Government’s Agricultural Production Export Development Authorities (APEDA) (Ministry of Commerce and Industry), NIN selected different sites within the vicinity of 30 km around Hyderabad.

The first visit was to a pomegranate farm and packinghouse with processing and cold storage facilities. The main harvesting season was still some months to come but growing, storage and processing of the off-season fruit was observed. The Technical director and co-owner of the premises, Mr Rao, guided the participants and provided information about quality and safety procedures in place and export requirements. The pomegranates produced in the farm are exported to the retail chain “Tesco” in the UK in form of extracted seeds. The seeds are packed in 1 kg pouches with nitrogen/carbon dioxide modified atmosphere.

The second field visit was to a privately owned packing house and grape farm with fruit on the vine ready for harvest in April and May. The fresh grapes are being exported to the retail chain “Sainsbury” in the UK. SOPs for the production of grapes were in place and followed. The inspection of the (non-operated) packinghouse showed that the company was under GLOBALGAP supervision. Mr Rao, who is also the technical manager of this company, gave presentations about EurepGAP/GLOBALGAP and HACCP certification. The main CCPs identified in the packing house were temperature in the cold storage rooms, quality of fruit received at the packinghouse from the field and cleaning of the fruit with clean water and if needed with disinfectants to remove possible contaminants from the fruit skin. Cleanliness of all premises is likewise important.

The third field visit was to an organic vegetable farm. All harvested and loosely packed produce was supplied to a local chain of organic food outlets. Packaging received little attention. The plantation was fairly clean and seems at first glance well managed, although yields and quality of the produce were low as it is characteristic for organic farming.

Upon return from the field visits, the three working groups reported on their observations.

The first group reported on their observation at the grape farm and packinghouse. The group’s observations included the following:

- Little information was provided on GAP, although the visual impression was a well managed farm including responsible use of agrochemicals
- Quality standards were set by the importer in the UK with GLOBALGAP certification following basic GMP
- According to the group, all procedures in the packinghouse were in place for a good quality production. After some critical questions, following was clarified: The produce flow inside the packinghouse was not optimal. Signs with instructions for the personnel were insufficient and where available only in English. Since most workers speak only local dialects, this can not be acceptable. Also colour charts for grading the fruit for packing were not strategically placed. There was no special area for the workers to pass, clean, undress/dress from the outside entering the packinghouse for work. Rooms for taking meals or resting were not identified.

The second group reported on head cabbage production at the organic vegetable farm. Many hazards were observed with the cultivation and harvest of the crop. Following observations were highlighted by the group:

- The harvested cabbages were unclean with soil, organic matter and insects.
- Workers did not have proper tools and did not dress properly for their work in the field.

- There was no proper transport of harvested vegetables within the farm – from the field area to the places of cleaning and storage.
- The vegetables were superficially washed in a drum with running water from a deep well without overflow.
- There were no control of the water quality
- No proper storage room for the collected harvested produce was available
- No sanitary facilities were identified
- The farm was located right beside a very busy road with heavy traffic.

It was concluded that this farm did not meet the required standards of GAP, GMP and GHP.

The third group reported on the management of food quality and safety in the pomegranate farm and packinghouse. Following findings were reported:

- It was mentioned by the farm operator that the trees are threatened by bacterial blight, a systemic disease without cure when infected. Nevertheless, basic hygiene was not consequently followed, particularly in tree care. The planted cultivar was allegedly not as prone to the disease infection but the fruit showed cracking, a sign of stress.
- The harvested off-season fruit were stored in the cold storage without prior wet or dry cleaning.
- The preparation/processing facility was located on the roof top of the storage building in a “kitchen-like” operation. At the time of the field visit, the ambient temperature was around 20-25°C, but in the main harvesting season outside temperatures will reach >40°C which will make processing of the fruit unbearable and sweating.
- The different processing rooms were not sufficiently separated from each other to avoid contamination from the dirt room to the processing and packaging room.
- In the dirt room fruit were fairly primitively brushed in water that was only changed a few times per day. Two basins contained water with 200 ppm chlorine but no equipment was available to check the concentration.
- None of the workers wore protective gloves while opening with sharp knives the hard fruit skin nor for removing the acid pulp.
- There was no quality assurance equipment to check the finished packs. In the cold room where the pouches were filled, the workers did not wear any protecting clothing.
- To tolerate this kind of operation without heat processing to avoid major microbial contamination in the final product may only be possible because of an environment with fruits of high acidity.

Section V

This section dealt with the importance of certification and other quality schemes for the horticultural sector. Mr Hoejskov gave an overview of different kinds of certification schemes including standards, protocols and code of practice. Principles and compliance and verification criteria as well as control points for different codes of practice were presented from the view point of producers, exporters and importers. Examples included GLOBALGAP with clearly defined IPM, ICM and HACCP and Codex Code of Hygiene with mixed principals and objectives focusing on GHP together with GAP and GMP.

It was pointed out to the participants that private certification schemes such as GLOBALGAP (previously called EurepGAP) have nothing to do national certification schemes. Private

certification schemes do often not represent a quality label or trademark but are assurances for general quality standards and compliance to certain codes of practice or protocols.

SWOT analyses and action plans

The final activity of the workshop included an analysis of strengths, weaknesses, opportunities and threats (SWOT) of the fresh fruit and vegetable sector in each of the participating countries. The participants were divided in country groups. Based on the SWOT analyses each country group was requested to draft an action plan for follow-up activities to the workshop. The SWOT analyses and action plans were presented and discussed in plenary. A summary of the SWOT analyses and action plans is given in Annex 3.

At the end of the workshop all participants received a certificate for their attendance.

5. Results

The workshop provided an opportunity for participants to obtain new knowledge and skills regarding food quality and safety of fresh fruits and vegetables and to become familiar with the FAO manual for trainers “Improving the quality and safety of fresh fruits and vegetables: A practical approach”. The workshop also provided an opportunity for experts from NIN to share information and experiences on issues related to the quality and safety of fresh fruits and vegetables in an Indian context. It also gave the participants an opportunity to develop new relationships and professional networks which could help to foster and improve cross-sectoral and subregional cooperation among officials and competent authorities in the future. The subregional workshop also provided an opportunity for participants to create a regional network to share the experiences, success stories, and effective quality and safety management strategies.

The participants showed great interest in the subject of the workshop and they were highly committed to actively participate and contribute to the working group sessions and plenary discussions. The field trip was well organised and gave an excellent opportunity to see how the quality and safety of fresh fruits and vegetables can be management in practice, “do’s and don’ts” and challenges faced by actors in the fruits and vegetables supply chain.

For FAO, the workshop provided an excellent opportunity to increase the awareness and knowledge about improving the quality and safety of fresh fruits and vegetables and to disseminate the manual for trainers “Improving the quality and safety of fresh fruits and vegetables: A practical approach”. Participants were encouraged to disseminate the knowledge obtained during the workshop to relevant stakeholders in their countries and to organize national training workshops. The participants were informed that FAO may be able to assist to conducting and funding national training courses, but that the initiative should be taken by the countries themselves.

6. Workshop evaluation

Feedback from the participants was gathered through an evaluation form that the participants were requested to fill out by the end of the workshop. The results from the evaluation forms indicated that the facilities and set-up of the workshop was adequately and properly organized. The agenda was organized systematically and covered all relevant aspects related to the quality and safety of fresh fruits and vegetables. The background material provided

was excellent and it was suggested that more handouts of material on the CD were distributed.

The results from the evaluation form also showed that the workshop was effective in achieving its objectives and fulfilled the expectations of the majority of the participants. Several participants reported that the training was very useful and that it would be beneficial to carry out similar training workshops after return to their home countries.

Participants also reported that they acquired new knowledge and skills about food quality and safety issues related to fresh fruits and vegetables and that the majority of the topics were covered in required detail. Additionally, the participants gave suggestions to other topics that could be included in similar future workshops. Among these suggestions are:

- Risk assessment
- More detailed hazard identification exercises
- Nutrition related issues
- Cost-benefit analyses
- Analytical techniques / procedures for selected parameters
- Trade possibilities and market analysis of quality and safety products
- Scope of the SPS Agreement in relation to WTO

It was also suggested that more case studies and examples were added to the presentations and as introduction to the group exercises. For more details about the feedback from the participants, please refer to Annex 4 where the results from the evaluation form are compiled.

7. Conclusions and recommendations for follow-up action

Mr Hoejskov concluded the workshop by thanking all participants and facilitators for their active participation and contribution to the success of the workshop. He also gave his gratitude to NIN for organising and hosting the workshop and for its contribution to the technical part of the programme.

The following follow-up actions are recommended:

- Distribute the electronic version of the FAO publication “A Practical Manual for Producers and Exporters from Asia – Regulations, standards and certification for agricultural exports” to all participants and lecturers
- Distribute the standard for ASEAN GAP to participants who requested a copy
- Integrate the feedback and suggestions provided by the participants in the organization of future regional, sub-regional and national workshop on the same issue
- Maintain close contact to the participants and assist them in organizing in-country training courses and in preparing project proposals and requests for assistance

8. List of Annexes

1. List of participants
2. Workshop programme
3. SWOT analyses and country action plans
4. Compiled evaluation forms

LIST OF PARTICIPANTS

FAO SUB-REGIONAL TRAINING WORKSHOP ON “IMPROVING THE QUALITY AND SAFETY OF FRESH FRUITS AND VEGETABLES: A PRACTICAL APPROACH”

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FAO Subregional Training Workshop
in collaboration with the National Institute of Nutrition, Hyderabad, India
Improving the quality and safety of fresh fruits and vegetables: A practical approach
Hyderabad, India, 4-8 February, 2008
Programme

Day 1**Section I. WORKSHOP INTRODUCTION**

8.00	Registration of Participants	Secretariats
9.00	Opening Remark	M. Pineiro, FAO and K. Sesikeran, NIN
9.15	Presentation 1.1: Improving the quality and safety of fresh fruits and vegetables: A practical approach	M. Pineiro, FAO
9.30	Introduction of the participants and workshop overview	M. Takeuchi, FAO
10.15	<i>Coffee Break</i>	

Section II. Importance of the horticultural sector

10.30	Plenary discussion: National experiences and participants expectations to the workshop	P. Hoejskov, FAO
11.00	Presentation: Opportunities and Challenges for the Asian Horticulture Sector	P. Chandra, ICAR
11.30	Presentation: Indian horticulture and NIN activities in the area of food quality and safety of fresh fruits and vegetables	K. Polasa and V. Sudershan Rao, NIN
12.00	Plenary Session: discussion to identify possible contributions to implement quality and safety programmes in their countries to channel market opportunities	P. Hoejskov, FAO
12.20	Presentation: An introduction to FAO's capacity building activities in Asia and the Pacific	P. Hoejskov, FAO
12.30	<i>Lunch</i>	

Section III. Quality maintenance and enhancement throughout the fresh fruit and vegetable chain

14.00	Presentation 3.1: The concept of quality applied to fresh fruits and vegetables	Dr Wilfried H.Schnitzler
15.30	<i>Coffee Break</i>	
16.00	Working Group Session: The Concept of Quality from the Standpoint of Actors in the Chain	
16.30	Plenary Session: Group presentations and discussion	M. Takeuchi, FAO
17.00	Summary and conclusions of Day 1	W. Schnitzler

Day 2

Section III (Cont.). Quality Maintenance And Enhancement Throughout The Fresh Fruit And Vegetable Chain

8.30	Presentation 3.2: Maintaining the quality and safety of fruits and vegetables throughout the post-harvest handling chain	W. Schnitzler
10.30	<i>Coffee Break</i>	
11.00	Working Group Session: The importance of appropriate logistics and post-harvest handling for fresh fruits and vegetables (Material 3.6)	
12.00	Group presentations	
12.30	Presentation 3.3: Guidelines for action plans to maintain the quality of fresh fruits and vegetables.	M. Takeuchi, FAO
12.45	Video presentation: Management of quality and safety of fresh fruits and vegetables in Hyderabad	V. Sudershan Rao, NIN
13.00	<i>Lunch</i>	

Section IV. Applying Food Safety Principles During The Production And Post-Harvest Fresh Fruit And Vegetables Chain

14.00	Presentation 4.1: Importance of safety in horticulture: implications for demand and trade Case study	M. Takeuchi, FAO
14.10	Presentation: Food safety of Fresh Fruits and Vegetables Indian perspective	V. Sudershan Rao, NIN
14.30	<i>Coffee Break</i>	
14.45	Presentation 4.2: Codex Food Safety Standards	M. Pineiro, FAO
15.15	Plenary Session: discussion on the key points to be taken into account to apply the codes and meet their requirements	M. Pineiro, and P. Hoejskov, FAO
16.00	Summary and conclusions of Day 2	W. Schnitzler

Day 3**Section IV (Cont.). Applying Food Safety Principles During The Production And Post-Harvest Fresh Fruit And Vegetables Chain**

8.30	Presentation 4.4, 4.5, 4.6: Programs for safety assurance of fresh fruits and vegetables. Preview Programmes (GAP, GMP, GHP, SOP)	W. Schnitzler
10.30	<i>Coffee Break</i>	
11.00	Plenary Session: discussion on the good practices, advantages and pitfalls	P. Hoejskov, FAO
12.30	<i>Lunch</i>	
14.00	Presentation 4.7: Hazard analysis in production and post-harvest handling of fresh fruits and vegetables	P. Chandra, ICAR
15.30	<i>Coffee Break</i>	
16.00	Working Group Session: Hazard identification and control measures, briefing of field visits	
17.00	Summary and conclusions of Day 3	W. Schnitzler

Day 4 FIELD VISITS		
8.00	Departure from hotel	
9.00	Visit to M/S Sam. Agritech Ltd. Pomegranate farm and packinghouse	
11.00	Visit to KDR Farms Grape farm and packinghouse	
13.30	Lunch	
14.30	Visit to Sresta Natural Bioproducts Pvt. Ltd. Organic vegetable farm	
17.30	Arrival at hotel	
Day 5		
8.30	Field Visits Discussion: Hazard identification observation from the field visit	P. Hoejskov, M. Takeuchi and W. Schnitzler
10.30	<i>Coffee Break</i>	
Section V. Importance Of The Certifications And Other Quality Schemes For The Horticultural Sector		
11.00	Presentation 5.1: Importance of certifications and other quality assurance schemes for the horticultural sector, Code of Practices, The Broad concept of GAP /Implementing GAP in countries exporting fresh fruits and vegetables in response to market requirements	P. Hoejskov, FAO
12.15	Working Group Session: Activity 1: Listing the difficulties that the producers would face to meet requirements of GLOBALGAP	
13.00	<i>Lunch</i>	
14.00	Country Group Session: Activity 3: SWOT Analysis and prepare General recommendations for the implementation of fresh fruits and vegetables quality and safety programmes at the national level	
15.30	<i>Coffee Break</i>	
16.00	Group presentation Plenary Session: Country analysis and general recommendation presentations, discussion	P. Hoejskov, FAO
17.15	Summary and conclusions of the workshop, the way forward Workshop Certificate Post-workshop Questionnaire Workshop Evaluation Closing	W. Schnitzler and P. Hoejskov

SWOT Analyses

Country	Strengths	Weaknesses	Opportunities	Threats
Bangladesh	<p>Favorable climate Already exporting FFV GAP/GMP know-how Available Some post-harvest technology is available Some processing industries are present Hortex Foundation established Fresh fruits producers and exporters association</p>	<p>Lack of improved varieties and technical know-how General lack of infrastructure Slow adoption of new ideas Lack of trained manpower</p>	<p>Possible to develop varieties and technologies Possibility of creating adequate infrastructure Possibility of organizing trainings for knowledge empowerment Appropriate transportation is to be developed</p>	<p>Reduced exports Increased imports Poor nutrition of the population</p>
Bhutan	<p>Strong food self sufficiency policy; Strong environmental policy; Various FFV grown because of existence of sub-tropical and temperate climatic zones Farmers generally only use manure and small quantities of chemical fertilizer and fungicides for fruit trees and hardly any for vegetables. Farmers are familiar with IPM and ICM systems. The application procedure and quantity required to apply chemical fertilizer is always instructed by the concerned local extension officers. The quality control standards for most fruits and vegetables are in place Bhutan Agriculture and Food</p>	<p>The farmers are mostly illiterate and it is difficult to make them understand the importance of nutrition and food safety Limited extension and regulatory officers Farm land have steep slopes and hence limited access for mechanization. Low population density (around 700,000) and hence small number of consumers Export limited to India and Bangladesh No specialized transport for FFV No specialized FFV exporters</p>	<p>Education of consumers and producers on quality and safety measures Establishment of specialized FFV traders Know-how expansion Up-grading extension and quality control officers Strengthening the manpower capacity of relevant laboratories and stakeholders Establishment of separate FFV quality and safety programmes Practice of specialized and commercialized farming system Reduced exports Lower income from horticulture Increased imports Promotion of organic products at international market</p>	<p>Additional manpower Higher budget Reduced exports</p>

	Regulatory Authority is in place. Relevant policies exist Good coordination among Govt. agencies Necessary infrastructure is in place			
Cambodia	Responsible institutions' exist (MAFF, MOC, MOH, & MOI) Certain regulations and food laws exist Working group on food safety established	Lack of standards Lack of technical capacities Limited legal documents on food safety Limited knowledge and experiences in post harvest management Lack of post harvest infrastructure Lack of awareness of food safety and quality	Strong commitment of concerned institutions Support from government Various international donors are present Human Resource Development	Farmers might not accept the concept of food quality and safety Traders and retailers might not comply with the food safety and quality standards and guidelines There might be no budget to implement the proposed action plan on food safety and quality
India	Varied agro-climatic conditions provide a huge potential for cultivation of varied and diversified FV crops Strong regional network to provide suitable package of practices to farmers for optimum crop production Some experience with export market and certification Good IT infrastructure and e-trading systems Agricultural knowledge kiosks in rural areas. Formation of National Commodity Derivative and Exchange Board (NCDEX) for trading of FFV Well developed HR infrastructure	Small fragmented, unorganized farms with low financial capacity Low productivity and high cost of cultivation Not fully developed post harvest infrastructure Poor transfer of technology, farmers not aware of quality requirement of domestic and export market. Mismatch between varieties produced and requirements at consumer markets. Not enough number of analytical and certification laboratories. No showcasing of Indian produce in other countries for promotion of export.	Potential to capture a large part of export market with Indian produce. Use of micro-irrigation for quality improvement of FFV and efficient water utilization. Potential to exploit a large resource of minor fruits, medicinal and aromatic plants of commercial value Organic production of fruits and vegetables for export market. Use of biotechnology for improved crop and yield. Increased use of IPM, ICM practices by farmers for increased productivity at lower cost.	Competition from other country's produces flooding the local market, drastically affecting the survival of local farmers. Reduced export due to poor showcasing of exportable varieties of fruits and vegetables. Inadequate perception and compliance with SPS and other quality norms

	<p>Adequate government support to farmers through formation of National Horticulture Mission, State Horticulture Mission, National Horticulture Board, etc, Good experience with Co-operatives. Availability of extensive services Increasing purchasing power of the consumer</p>			
Lao PDR	<p>Lao PDR would be free of chemicals as a part of the socio-economic strategy Many farms are organic Farmers have limited access to markets and chemical inputs are expensive Several Government regulations are in place</p>	<p>Low productivity Production not linked to market or food processing Lack of trained staff Lack of equipment and infrastructure Lack of technical know-how Limited awareness of quality and safety</p>	<p>Establishment of National quality and safety programme Clear allocation of business among Ministries Seeking international expertise Updating the existing regulations and standards</p>	<p>Local horticulture will suffer Imports will increase</p>
Maldives	<p>Literacy percentage is high Suitable climate Very good varieties Low agro-chemical usage</p>	<p>Small farm size Lack of transportation Poor soils Imported inputs Lack of qualified human resources Lack of good laboratories No quality control standards No PHT infrastructure</p>	<p>Farmers can learn new practices Large demand exists Some uninhabited islands can be used for agricultural production Cooperatives can be organized</p>	<p>Reduced exports and farmers' income</p>
Myanmar	<p>Government keen to encourage Food quality and safety</p>	<p>Lack of coordination among different Ministries Limited know-how Lack of consumer awareness Inadequate financial support Lack of monitoring and inspection Lack of PHT Infrastructure</p>	<p>Better nutrition of people Could earn foreign exchange Increase farmers' income Could better meet the food quality and safety requirements of FFV</p>	<p>Reduced exports and farmers' income</p>

Nepal	<p>Diversified crops and climates</p> <p>Low level of external inputs</p> <p>Some existing organic farming units</p> <p>Government regulations and policies are in place</p> <p>Adequate infrastructure is in place</p> <p>Public-Private partnership exists</p> <p>Crop zone demarcation</p> <p>Available indigenous knowledge on crop production</p>	<p>Poor transport infrastructure</p> <p>Poor research and extension</p> <p>Inadequate monitoring mechanism</p> <p>Only small and medium level of food processing</p> <p>Subsistence farming</p> <p>Poor linkages between production, markets and processors</p> <p>Inadequate education of food safety and its implementation</p>	<p>Government is conscious of food safety</p> <p>Private sector is coming forward for large scale operations</p> <p>Expanding niche markets</p> <p>Opportunities for global trade</p> <p>Possibilities of increasing production and productivity</p>	<p>Political instability</p> <p>Weak implementation of plans and policies</p> <p>Losing competitiveness</p> <p>Costlier technology adoption</p>
Sri Lanka	<p>Favorable climate for cultivation of fruits and vegetables</p> <p>High literacy rate</p> <p>Availability of appropriate human resource</p> <p>Availability of expertise</p> <p>Consumer demand for quality products</p> <p>Natural environment</p> <p>Government funded projects</p> <p>Increasing demand for export of fruits and vegetables</p>	<p>Lack of coordination among stakeholders</p> <p>Difficult to maintain product quality by small farmers</p> <p>Lack of organized production</p> <p>Lack of quality and safety infrastructure</p> <p>High post harvest losses</p> <p>Products not meeting international standards</p>	<p>Greater recognition of the importance of quality and safety</p> <p>Create awareness programmes</p> <p>Crop zoning by improving production with GAP/GMP</p> <p>Create PHT infrastructure</p> <p>Introduce necessary regulations</p>	<p>Reduced exports</p> <p>Lower income from horticulture</p> <p>Increased imports</p>

Summary of action plans prepared by the participants

Bangladesh

- Development of GAP/ GMP/ GHP/ HACCP standards and protocols
- Organise the producers and entrepreneurs in groups and cooperatives
- Develop infrastructure like transport, packing houses, etc
- Trainings to growers, entrepreneurs and Government officials

Bhutan

- Massive awareness campaign on quality and safety measures to the producers, traders and consumers in two districts
- Proper trainings on quality and safety measures to the extension and quality control officers in two districts
- Equip the relevant laboratories and institutes in terms of manpower and testing equipment
- Development of national GAP and SOPs for export fruits and vegetables; apple, mandarin, potato, chili, ginger, mushroom, etc.

Cambodia

- Workshop at national level
- Workshop on food quality and safety for producers, traders, and retailers
- Mass media publicity (Radio, poster, leaflet, TV)
- Training of agricultural extension officers and field workers
- Legal document development

India

- Including concepts and requirements of GAP, GMP, GHP at R&D level.
- Update the curriculum of related education.
- Creation of relevant literature in local languages
- Training of trainers, creation of demonstration plots for on-hand experience.
- Intensification of activities and participation of end users in such activities

- Including local food chains and entrepreneurs in quality certification and extension programmes.
- To finalize GAP, GMP and GHP for India for various commodities.
- Showcasing of Indian produce at international forums.

Lao PDR

- Establish fresh fruits and vegetables quality and safety programme at national level
- Clear demarcation of responsibilities and mandates among different Ministries and institutions
- Establishment of appropriate multi-agency bodies for better coordination
- Enhancement of support from Government
- Formulation of national policy on FFV
- Preparation of quality and safety literature in local language
- Updating existing rules and regulations
- Sourcing international expertise

Maldives

- Organize trainings for farmers on new practices
- Create transportation and other infrastructure
- Formulate Government policies
- Form cooperatives for efficiency

Myanmar

- Enhance coordination among different Ministries
- Create knowledge pool
- Mass media publicity for consumer awareness
- Increased financial allocation
- Create mechanism for monitoring and inspection
- Expand PHT infrastructure

Nepal

- Incorporation of quality and safety of fruits and vegetables related issues in training programmes
- Intensive review of work done all over the world to develop a knowledge pool
- Awareness workshops for different stakeholders
- Development of standards and protocols for different fruits and vegetables

Sri Lanka

- Greater recognition of the importance of quality and safety
- Create awareness programmes
- Crop zoning by Government
- Improve production based on GAP and GMP
- Create PHT infrastructure
- Introduce necessary regulations

**FAO SUBREGIONAL TRAINING WORKSHOP ON IMPROVING THE QUALITY
AND SAFETY OF FRESH FRUITS AND VEGETABLES: A PRACTICAL
APPROACH**

Hyderabad, India 4-8 February 2008

WORKSHOP EVALUATION FORM

Please answer the following questions in order to evaluate the workshop and to allow for improvements in future workshops.

I. FACILITIES AND SET-UP

	YES	NO
1. Was the room adequate?	100%	0%
2. Were seats well placed?	95%	5%
3. Could you see and listen well?	100%	0%
4. Were the morning and afternoon sessions properly distributed?	100%	0%

Comments:

- Need more workshops and training courses
- A follow-up workshop to be conducted to assess the changes this workshop had brought along
- This is very good training for all countries, please include other aspects also in future workshops
- Need more workshops to get more experience
- More involvement of agricultural universities in agriculture and horticulture related programmes
- Very good setup
- More group discussions are desired. Lectures should be limited to not more than one hour with discussions in between
- For better and more interaction, the trainers should be both from developed and developing countries
- Much more field visit and practical things should be included
- An example should be set up before the participants were asked into the exercise so that they understand properly

II. ORGANIZATION.

5. How was the agenda organized (subjects and timing)?:

Excellent: 71% Satisfactory: 29% Not satisfactory: 0%

Comments:

- Perhaps a topic on potential and diversified use of fruits and vegetables for domestic and export markets could be included
- Very well organized
- The agenda was organized systematically
- Good

6. Background and training materials received were:

Excellent: 57% Satisfactory: 43% Not Satisfactory: 0%

Comments:

- More distribution of hardcopy material would have been good
- I have not seen the CD yet, it may be excellent
- Good presentations are used to explain their objective
- Material provided in CD is good. Other material could be provided by e-mail
- The CD provided is excellent. But there was lacking white sheets for field trip
- The material be made much more simple

7. What is your opinion of the workshop?

Excellent: 76% Satisfactory: 24% Not satisfactory: 0%

Comments:

- Now-a-days such type of workshop is very much helpful to us. We can try to aware our policy makers to enhance their programme about food safety and quality
- The workshop will be great help for understanding safety food, vegetables etc.
- The workshop has been done well. However, the exercises could be diversified

III. EXPECTATIONS

8. Up to what point has the workshop fulfilled your expectations?

Completely: 57% Partially: 43% Scarcely: 0%

Comments:

- Because I participate for the first time I did not understand completely
- Some of us were already exposed to some of the topics covered by the programme. However, the additional info given was appreciated
- Information gathered from the workshop is very useful to establish a programme in my country

- More discussion on experiences and success stories in other countries would help us in drawing out policy plans for our country

9. Can it be applied to your work?

Completely: 67%

Partially: 33%

Scarcely: 0%

Comments:

- Yes, information provided will help the concerned people very much
- The new knowledge cannot be applied right after return to home country, but in the long run it can be applied
- Application would be with respect to analytical procedures for SPS quality
- I like to disseminate it to the concerned high level officials and to organize a workshop with all concerned agencies
- I work in the area of post-harvest. The HACCP analysis will help me to organize training courses

IV. CONTENTS

10. Was the time frame for each section adequate?

Completely: 72%

Partially: 28%

Scarcely: 0%

Comments:

- Less time for group work and individual experiences
- The presentation should be limited to not more than one hour

11. Which topics were presented with the required degree of detail and which were not?

Required degree of detail:

- The concept of quality applied to FFV
- Maintaining the quality and safety of FFV
- All topics
- Programme for safety assurance of FFV (GAP, GMP, GHP and SOPs)
- GAP, GMP, GHP
- All topics were presented with the required degree of detail
- FFV quality aspects
- The time arrangement for each topic covered was well arranged
- All the topics were with the required degree of detail
- All the topics cover the knowledge of improving the quality and safety of fresh fruits and vegetables – a practical approach
- All were in balanced way
- HACCP

Not required degree of detail:

- HACCP for post production systems was too lengthy. As a result it lost its focus
- FFV safety aspects

- Quality management and enhancement of fresh fruits and vegetables

12. Which topics would you add to future workshops?

Comments:

- GAP, GMP and GHP
- HACCP in detail, risk assessment and more practice on this
- Hazard identification
- More case studies and examples
- Nutrition related issues
- More on GAP, GMP and GHP
- Cost-benefit analyses
- Analytical techniques / procedures for selected parameters
- Quality control (ICS), certification body (CB)
- Trade possibilities and market analysis of quality and safety products
- Case studies of any success story of any country in Asian region
- Site visits to farmers
- Scope of SPS in relation to WTO

13. What topics would you not include in future workshops?

Comments:

- Importance of horticultural sector
- All topics were important and need to receive more details in future workshops
- International standards – they are available on the net for anybody's reference
- None of them
- HACCP
- The handouts given to us in the field trips

14. General comments:

- This was a very good workshop, this will help me a lot
- Before every group discussion, an example may be presented so that the participants are clear about boundaries and expectations of the discussion
- This was a very good workshop to know about other countries' GAP, GMP and GHP
- I will be very grateful to participate in future workshops in order to get more experience to adopt in our country Bhutan
- The adequate time for presentations need to be adjusted by extending the duration of the workshop
- On the whole a very informative programme
- Relevant topic with relevant subject matter coverage
- More time for individual and group exercises
- Icebreaking will help for better understanding
- Open, friendly and participative environment
- The programme explained very well. Facilities were satisfactory
- Thanks FAO and Norwegian Government for helping this workshop

- The workshop was very informative. The knowledge gain will be of immense use in drawing up policy programmes to develop and improve the fresh fruit and vegetable sector in Sri Lanka
- Training site should be at a place having excellent fields for showing to the trainees a real practical approach
- In workshop I got many knowledges from other countries. When I go back to my country I will share my knowledge to my growers and retailers
- It was a nice workshop. My knowledge very much enhanced about the food safety and quality which is very essential for human health
- Very valuable workshop for developing countries to assist producing quality and safety fresh fruits and vegetables
- Good and useful workshop
- The management of NIN was good
- Lectures should be reduced
- Practical exercises should be increased
- Case studies should be added
- Well done