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Editor's Note

Although Bangladesh has made a good progress in the production of horticultural commodities but there is a considerable gap between gross production and net availability by the consumers. There are considerable postharvest losses. Efficient management during harvesting, sorting, grading, washing, packaging, transport, storage and marketing can prevent huge losses. Several postharvest management technologies have been developed by BARI, Hortex Foundation & other research institutes including Agricultural Universities that can be effectively utilized for addressing postharvest management problems and its large scale adoption and development of quality assurance system. Besides, best practices around the world will also help the stakeholders for raising awareness and building technical capacity to apply improved postharvest practices efficiently.

Development Partners in collaboration with relevant government agencies and private organization as well as research institutes including Agricultural Universities would take initiatives and allocate resources to improve the postharvest research and handling conditions, and there by improve the socio-economic status of the different stakeholders involved in the supply chain of horticultural produce in Bangladesh.

Lack of high yielding exportable varieties that resist biotic (insect-pest and diseases) and a-biotic stresses (heat, cold, drought and flood), inadequate production, irregular supply, inefficient pest management, lack of awareness of quality produces, inefficient postharvest management, inadequate packaging system, limited air space, high air freight cost, lack of cold storage facilities inside the airport, insufficient refrigerated reefer trucks and lack of export oriented research and development activities are the major constraints of horticultural produce export in Bangladesh.

But the experiences gained in the past, it can possibly be said that with the improvement of quality of horticultural produce as well as harvesting, handling, sorting, grading, washing, packaging and cool chain system, there seems to be a bright prospect for augmenting horticultural produce export from Bangladesh in future to the mainstream market of Europe, Middle East, Far East, Russian Federation & North American Countries.

Standard Practices of Harvesting, Sorting, Grading & Washing for Horticultural Produce

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Introduction

In general, horticultural crops include fruits, vegetables, flower & ornamentals and spices. However, disregarding some controversies, plantation crops and medicinal plants are also considered as horticultural crops. Crops like potato, sweet potato, aroid and yam are the staple food crops in some countries, but are considered as horticultural crops in Bangladesh. The horticultural crops like fruits and vegetables can play a significant role in nutritional improvement, employment generation, food and financial security of the people of Bangladesh as well as supplying raw materials for agro-processing industries and improving foreign exchange earnings through export.

Fresh horticultural crops are highly perishable and as such, prone to heavy post-harvest losses due to their inherent characteristics like live organs (that respire continuously on and off the plant), high water content (subject to desiccation through the process of transpiration), subject to attack by pathogens and insects. The losses are also occurs due to poor pre-production, harvesting and postharvest management as well as lack of appropriate processing and marketing facilities. These losses have several adverse impacts on farmer's income, consumer prices and nutritional quality of the produce. Because of the poor planting material, cultural practices including harvesting, harvesting methods and handling practices, the quality of harvested produce are below standard in Bangladesh.

The post-harvest technology area for economic development has not received required thrust in the agricultural research and development agenda in the past. More attention is needed for different post-harvest aspects of fruits and vegetables. In this paper, an attempt has been made to review the existing harvesting, sorting, grading and washing practices of horticultural produce and suggest best practices of the same to maintain the quality of the produce as safe.

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Status of horticultural crops in Bangladesh

Items	Fruits	Vegetables	Potato	Spices	Flower & ornamentals
Area	0.243 m ha	0.452 m ha	0.483 m ha	0.316 m ha	0.0045 m ha
Production	4.52 m tons	3.06 m tons	8.65 m tons	1.25 m tons	-
Present consumption (g/head/day)	78 g	55 g	73 g	34 g	-
Requirement for consumption (g/head/day)	115 g	220 g	100 g	54 g	-
Production requirement	6.72 m tons	11.24 m tons	5.84 m tons	1.625 m tons	-
Deficit	32%	75%	-	37%	-
Production to be increased	2.2 m tons	8.18 m tons	Surplus 2.81 m tons	0.375 m tons	-

Source: BBS 2011, DAE 2015, Data Analysis by Hortex Foundation

Postharvest losses of horticultural produce

A considerable proportion of the horticultural produce especially fruits and vegetables are lost after harvest. Post-harvest losses of fresh horticultural produce occur at different points in the entire supply chain. These losses are quantitative, qualitative and economic. Post-harvest losses of some horticultural produce are incorporated here:

Produce	Post-harvest loss (%)	Produce	Post-harvest loss (%)
Cauliflower	22.0	Chilli	14.0
Cucumber	24.3	Potato	25.0
Cabbage	25.0	Jackfruit	25.3
Country bean	29.6	Banana	26.6
Eggplant	32.0	Litchi	36.6
Tomato	42.5	Mango	39.3
Bitter gourd	27.0	Papaya	41.4
Okra	34.0		

Source: BARI Annual Report 2008-2013

The post-harvest losses varied from crop to crop and among the above selected crops, the highest loss was recorded in tomato (42.5%) followed by papaya (41.4%) and lowest loss was found in chilli (14%). Post-harvest spoilage of fruits and vegetables are enormous ranging from 14-42.5% that causes loss of Tk. 34420 million (Hassan, 2010).

Hassan (2012) also reported that the post-harvest losses of important fruits and vegetables along the supply chain ranging from 24-44%. Similar study was also carried out

by Post-harvest Technology Section, HRC, BARI and the losses estimated 14-44.5%.

All of the studies revealed that the post-harvest losses of fruits and vegetables are very high in Bangladesh. The losses are mainly due to the sub-standard harvesting technique and post-harvest handling practices like sorting, grading, washing, packaging, inadequate transport and storage facilities and ignorance of different stakeholders involved in the supply chain.

Existing & standard harvesting, sorting, grading, washing practices for horticultural produce

A. HARVESTING

Harvesting is the deliberate picking of the commodity. Care in harvesting and proper handling is necessary to preserve subsequent quality of fruits and vegetables. Maturity is the basis for determining the exact moment/stage to pick a crop. The stage at which the crops would be harvested has an important bearing on quality. Good quality is obtained when harvesting is done at the proper stage of maturity. Fruits harvested before optimum maturity may not ripen adequately and may not develop adequate flavor, while crops harvested late (over-mature) have a shorter post-harvest life and will deteriorate easily. Similarly, vegetables harvested too soon may look green but are of poor quality. On the other hand, delayed harvesting may increase their susceptibility to decay, resulting in poor quality and hence low market value. The fruits and vegetables harvested at proper stage of maturity will have better taste and appearance due to full development of chemical constituents responsible for aroma and flavor, maximum respiratory substrates, less stomata and thicker cuticle. Maturity indices of some horticultural produce are incorporated below:



A view of guava and lemon harvesting

Maturity indices of some horticultural crops

Crops	Maturity Index
Mango	Slight color development on the shoulder, healthy one or two ripe fruits fall from the plant naturally, specific gravity of fruits ranges between 1.01 and 1.02, no. of days 90-120 from the fruit set stage depends on variety and climatic condition.
Litchi	At about 55-60 days after fruits set, flatness of tubercles, comparative smoothness of the epicarp, fruit color change from greenish to pinkish or deep red.
Jackfruit	Spikes of the rind become flat and the tips become black, density of latex, sound on striking fruit with a finger and no. of days from fruit set (120-150 days).
Banana	Ridges on the surface of the fruit skin change from angular to round (3/4 th in full stage), floral part at the top of the fruit should be dried up and the base of the bunch should be changed in color from dark green to light green.
Guava	Fruits turn greenish yellow, specific gravity between 0.8 to 0.9 and TSS between 10 ^o to 12 ^o brix.
Pineapple	At slight color break stage, Giantkew show orange-yellow while honey queen is harvested at M ₁ (fruit turning yellowish at the base), M ₂ (fruit is colored up to half of its height i.e. 25 to 50% yellow) and M ₃ (fruit is colored more than half of its height i.e. more than 50% yellow).
Jujube/ber	Change in color from green to light yellow.
Lime & Lemon	Fruits fully developed but the skin is green.
Strawberry	For distant markets: 3/4 th red colored fruits, local markets: fully red fruits.
Brinjal	Skin should be bright and glossy, 15-20 days after fruit set.
Tomato	Local markets: pink/light red stage fruits, distant market: color break stage (mature green stage).
Okra	6 th day after anthesis.
Gourds	Tender when pierced with thumbnail, floral parts at the bottom of the fruit is still attached firmly, 8-10 days after fruit set.
Radish	BARI Mula-1, BARI Mula-2 and BARI Mula-3 generally harvested after 70, 75 and 60 days of seed sowing respectively.
Teasel gourd	At deep green stage.
Cucumber	Before start of yellowing, 15-20 days after anthesis.
Peas	When pods are filled, green and tender.
French bean	Within 45-60 days of seed sowing or within 15 days of flowering.
Potato	When haulms/leaves start drying, about 8-10 days after haulm pulling.
Onion	When 50-75% of the plant leaves topple down (fall down), neck is small and tissue begin to soften.
Gladiolus	When 1-2 florets start opening.
Rose	When 1-2 buds start opening.

The time (early or late in the season) for harvest is usually a compromise due to different factors such as prices, type of product (climacteric or non-climacteric), consumers acceptance and form of consumption, distance of the markets. Produce is best harvested when the temperature is coolest in the day. However, there are minimum requirements that would be considered including maturity

of the crop, minimum quality standard and consumer acceptance.

Faulty/poor harvesting method and technique can lead to skin breakage, crushing and bruising that promote physiological damage and disease infection. Mechanical injury increases the susceptibility of produce to disease infection. Dirty clippers, knives, harvest bags and



Faulty harvesting of mango

field crates can also lead to contamination. Harvesting of fruits and vegetables differs from each other because of their diversity of structural plant types. Again, different kind of fruits and vegetables require different methods of harvesting, e.g. hand harvesting, assisted harvesting and mechanical harvesting. However, harvesting techniques of some horticultural produce are given below:

Harvesting techniques of some horticultural produces:

Crops	Harvesting Techniques
Banana	The pseudo-stem should be lopped/cut with a sickle in such way that the bunch will not fall to the ground but hang on. Then the bunch should be severed with about 30 cm peduncle/stalk to make handling easy.
Jackfruit	If the fruit is within reach, it can be cut with a sickle. In tall trees, a sack may be placed on the fruit with a rope tied on the peduncle. After cutting, the fruit is gradually lowered to the ground.
Litchi	The bunch should be cut with a portion of the branch and a few leaves. Harvesting individual fruits ruptures the skin at the stem and rotting may occur.
Mango	Fruits should be harvested by hand as much as possible. For tall trees, a bamboo pole harvester has to be used.
Papaya	Papaya is generally harvested by twisting the fruit until it snaps off. Ladders are often used to harvest tall trees.
Pineapple	The picker/harvester should wearing globes, grasps the crown and gives it a downward bend until the peduncle breaks off. A sharp knife can be used, leaving a basal stem of about a half-inch long.
Radish and Carrot	The whole plant should be pulled out. It may be marketed with or without leaves.
Potato	At harvest time, the moisture content of the tubers should be reduced to minimize damage during handling. This can be accomplished by cutting off the tops a week before digging or leaving the tubers on the ground after digging. The exposure may be from 15 to 60 minutes depending on the weather. A spading fork is the best equipment for hand digging. A simple harvesting plough or a potato digger may also be used.

Crops	Harvesting Techniques
Cabbage	The head is cut off the base with a heavy knife.
Broccoli	Large leaves should be removed and stem should be cut at 20-25 cm from the head.
Cauliflower	Leaves are left on the curd by cutting well below the stem and trimming above the curd to protect it during handling.
Beans	Hand picking is employed by farmer.
Cucumber	The fruits are picked or cut from the vines, leaving a short piece of stem.
Brinjal	Fruits are cut from the plant, leaving the fleshy calyx and a short piece of stem on the fruit.
Okra	During harvesting, globes or similar protective garments should be worn to avoid rubbing against the spiny plant surfaces. The pods are detached by breaking at the peduncle with a little twist or cutting the peduncle with a sharp knife.
Tomato	The fruit is separated from the vine by a half turn or twist. When it is mature, it easily separates from the vine.

The salient points of existing harvesting practices

- The knowledge of maturity indices is often inadequate. As a result sometimes immature or over mature produce is harvested and harvesting is done at any time of the day.
- Inadequate or poorly designed harvesting tools/equipments and harvest container.
- The recommended time of final spraying and harvest are often not followed. Farmers are not usually aware about the requirement, and they are more interested to take advantage of high price. The pesticide spray has to be applied not less than 7 days before harvest. But, farmers and traders often used the spray directly on the fruits and vegetables just before harvesting.
- Improved harvesting techniques are seldom practiced. Traditional methods such as pulling, twisting, jerking, bending until it breaks are normally used in harvesting horticultural produce. Moreover, dirty chippers, knives, harvest bags and field crates are also used.
- Knowledge gap in quality and safety of produce throughout the supply chain.
- Removal of field heat is seldom practiced. Dumping produce in piles causes bruising and deteriorates quality.
- Growers often grow the same commodity, same variety and plant at almost same time resulting glut at production due to prices fall sharply and loss stands high after harvest.

Standard practices for harvesting and handling

- An appropriate maturity index should be followed to determine when to harvest produce.
- An appropriate technique should be used for harvesting of produce.
- Equipment and tools should be suitable for harvesting and should be checked for cleanliness before use and cleaned as required.

- Containers should be suitable for harvesting of produce and are not overfilled.
- Liners should be used to protect produce if containers have rough surfaces.
- Containers should be covered to reduce moisture loss and exposure to the sun.
- Containers should be checked for soundness and cleanliness before use and cleaned or discarded as required.
- Produce should be harvested in the coolest time of the day and harvesting in the rain is avoided, if possible.
- Produce should be removed from the field as quickly as possible.
- Harvest produce should be placed in the shade if long delays occur before transport.
- Packed containers should not be stacked on top of each other unless they are designed.
- Produce should not direct contact with the soil or with the floor of handling, packing or storage areas.

B. SORTING

Sorting is the process of classifying into groups designated by the person classifies the produce either according to a set criteria or whatever criteria he may desire. The operation consists of the elimination of all produce with visible defects (deformed, undersized, oversized, wounded etc.) Mechanical injury increases the susceptibility of produce to disease infection. Bruises, abrasions, cracks and wounds allow disease organism to enter into the produce.

At present, the produce is hardly sorted and produce are prepared for market without minimum sorting. But the standard practice for sorting is that the produce should be sorted properly and graded, and finally packed according to customer or market requirements. Farm level sorting based on standard is not yet practiced in the country.



Sorting process of tomato

C. GRADING

Grading is the process of classifying produce into groups according to a set of recognized criteria of quality and size, with each group bearing an accepted name and size grouping. While grades are the units of grading or the names of the groups to which the produce are classified like Fancy, Grades 1, 2 and 3. If the produce is classified into different sizes, the process is specifically called sizing while size classification is the unit of sizing like large, medium and small.

Grade standards identify the degree of quality of a commodity and its value. Such standards are essential tools of quality assurance and provide a common language for traders, among growers, handlers, processors and receivers at terminal market.

Advantages of grading for stakeholders:

- a. Consumer/processor: Permits him to buy the quality he wants and is willing to pay for, eliminates sorting by processor, hence, work is facilitated.
- b. Farmer: Gives a sound basis for pricing, ensure fairness in pooling produce from different members of a cooperative.
- c. Buyer and seller: Establishes a common language, enables long distance transaction of sale.
- d. Courts: Facilitates settling of disputes, certificate of inspection is acceptable as evidence.
- e. General public, producers and traders: Makes price information meaningful.
- f. Transporter/Trucker-buyer: Lesser damage. More damaged in mixed loads.
- g. Banks: Establishes paying capacity of farmer asking for a loan.

Salient points of existing grading practices

- a. Generally grading is not in practice, except in a few cases. However, good quality fruits or vegetables are spread in the upper layers of the basket to attract attention of the buyer. Grading when practiced is done manually. However, potato grader is used in some cases like export.
- b. Farmers and traders classify their produce using own standards, usually marketable and unmarketable, good and reject. However, farmers follow specific instructions given by the customers as to preferred quality.
- c. Sizing is more common than sorting for quality. Different size is easier to recognize than different grades.
- d. National grade standards are not yet formulated in Bangladesh.

Conditions for successful implementation of grading

- a. Significant proportion of the commodity should fall into the higher grades.
- b. There should be a premium price on quality graded produce.
- c. Standards should be acceptable, understandable and appropriate.
- d. There should be sufficient licensed, trained and dedicated inspectors.
- e. Post-harvest methods should not cause too much deterioration of quality along the handling chain.

How to grade

- a. Familiarize yourself with the standards.
- b. Hold as much commodity per hand as possible in order to inspect effectively.
- c. Have sufficient light in the packing house.
- d. Have work breaks to maintain efficiency.



Standard practices of country bean grading and French bean packaging

Produce should be graded and packed according to customer or market requirements.

D. WASHING

Purpose of washing

- a. To remove dirt, latex, residues, mealy bugs, sooty moulds and other extraneous materials in order to meet the demand of consumers for clean and safe produce.
- b. To render commodity more saleable-clean commodity command a better price than dirty commodity.

Methods of washing

- a. **Spray washing**-advantage of fresh and clean water comes in contact with commodity, reducing risk of infection.
- b. **Soak and rinse**-use of detergents such as sodium meta-silicate in soaking tank, water tubs, basins or vertically cut drums.

Factors determining whether to wash or not

- a. **Consumer demand**-exporters generally demand clean produce, so washing is usually practiced for export.
- b. **Commodity**-onion, garlic, strawberry, potato/sweet potato are not usually washed before storage.
- c. **Care in harvesting**-if there is no chance of getting the commodities dirty, no washing is necessary.

d. **Season**-vegetables, especially leafy vegetables are harvested dirty during rainy season, so they are usually washed.

Problems in washing

a. **Spread of microorganisms from infected to wounded tissues**-to overcome the problem, trim or sort the produce before washing, use fungicide (Thiabendazole, Imidazole etc.), Sodium hypochlorite (NaOCl), Sodium Orthophenyle Phenate (SOPP), Sol-A (Salmosan), Citrox etc.

Drying of surface moisture after washing

a. Excess surface moisture creates a favorable condition for the growth of micro-organisms. Hence, it should be removed through placing the produce in rack to drip or use of high velocity air.

Salient points of existing washing practices

- Produce is often washed with dirty or polluted water.
- Produce is often sprinkled with dirty water.
- Dirty water also pollutes the produce and the environment.
- Leafy vegetables are frequently watered to make them look fresh and also increase their weight.
- Produce can also be contaminated by dirty hands through sneezing, coughing and dirty water.
- Retail markets often lack suitable washing facilities leading to poor hygiene for retailers.

Salient points of standard washing practices

- Clean/potable water should be used after harvest for washing produce as well as cleaning field containers. The quality of water is particularly concern when it comes into direct contact with the edible portion of the produce. Hence, the water used for washing the fresh produce should be clean and free of contamination.
- Water used after harvest for washing the fresh produce should be changed regularly to minimize contamination from spoilage organisms.
- Disinfectants, if used, should be based on manufacturers' recommendation.

Washing technologies

- Washed the produce with 200 ppm NaOCl for 5 minutes appropriate for papaya, tomato, eggplant, country bean, green chilli, okra, spinach and ridge gourd.
- Dipped in 1% calcium chloride solution for strawberry.
- Dipped in aqueous 1- MCP (Methyl CycloPropene) 200 microgram per litre of water for 10 minutes suitable for tomato and 100 microgram per litre of water for 5 minutes for banana.

- Dipped in fungicide like Thiabendazole (0.5g/lit) or Imidazole (0.5 g/l) for banana.
- Sodium Orthophenyle Phenate (SOPP) at 2.3% solution against citrus canker infection.



Jara lemon washing by SOPP for export

Suggestions for improving the present situation

- Create awareness on the importance of maturity indices as well as harvesting time and techniques through training, preparation & distribution of manuals, posters, leaflets and television advertisement.
- Create awareness and disseminate the protocols of fresh produce sorting, grading and washing through hands on demonstration of technologies and training.
- Make available modern harvesting equipments and technologies suited to local conditions.
- Encourage subsidy from government and ensure investment from the private sectors to establish pack house, sorting, grading and washing facilities.
- Research and development activities should be strengthened for developing improve post-harvest technologies including harvesting, sorting, grading and washing of fresh horticultural produce.

Hortex news in brief



A view of Governing Body Meeting of Hortex Foundation

The 97th & 98th meeting of the Governing Body of Horticulture Export Development Foundation (Hortex Foundation) were held on 23 October 2014 and 25 December 2014 respectively at its conference room under the Chairmanship of Dr. S M Nazmul Islam, Secretary, Ministry of Agriculture, Government of the People's Republic of Bangladesh and Chairman, Hortex Foundation. The meeting discussed on various administrative issues and policy directives were given.

Market intelligence support services by Hortex

In the reporting period July-December 2014, AGM (Marketing), Hortex provided 60 nos. market intelligence support services to the different new entrepreneurs, producers, exporters, researchers. The Foundation provided cool chain transportation (239 round trips by five reefer trucks) support services for different business organizations. The notable among the recipients including marketing services are incorporated here:

Service recipients	Specific service provided by Hortex
Md. Shahjahan Ali Advisor, Petrochem (Bangladesh), Ltd., Uttara C/A, Dhaka (08 July 2014)	He was given technical specifications incl. export cost analysis on Malaysia market and overall recommendations regarding potato export promotion to the world market from Bangladesh as new exporter.
Mr. Swapan Kumar Saha, Addl.Secretary, MOA (08 July 2014)	He was provided general information and recommendations on potato export to the world market from Bangladesh as policy issue.
Mr. Pulak Ranjan Saha, J. Secretary, MOA(08 Jul 2014)	He was provided general information and recommendations on potato export from Bangladesh as policy issue.
Engr. Abdul Matin Miazi, CEO, ADN Telecom Ltd., Dhaka (09 Jul. 2014)	As a new entrepreneur, he was linked with CCMC Belabo, Kapasia collecting Banana, Guava & Veg. for marketing. He was provided exportable list of fruits & vegetables incl. Hortex publications.

Service recipients	Specific service provided by Hortex
Dr Shaikh Abdul Quader, MD, Agriconcern Ltd, Dhaka (10 July 2014)	For potato export promotion in the international market by cartons, he was delivered two sample paper cartons @ 5kg & 10kg weight from AGM (Marketing), Hortex Foundation collected from Greentex, Mirpur, Dhaka.
Mr. Nabil Salman Kadhim, Sha Associates, Importer, Exporter & Supplier of Iraq (10 July 2014)	As per sourcing of different agro-commodities and products from Bangladesh for Iraq market (sha.associates7@gmail.com, nabeelsalman1966@gmail.com), he was linked with Hortex website for more info about the Foundation and easy access of more than 100 exportable horticultural crops.
Mr. Aliaksei Shcharbakou, Director, URALKALI Trading, Singapore (10 July 2014)	As per meeting held on 03 Jul. 2014 at MOA regarding balanced fertilization produces higher yield project, he was delivered brief info about Hortex incl. list of exportable horticultural crops for development of good partner between the organizations for promoting export.
Mr. Uttam K. Saha, Chairman, Pi Technologies Ltd., Niketan, Gulshan-1, Dhaka-1212 (13 July 2014)	As a new exporter of fruits and vegetables, he was delivered list of exportable horticultural crops in Bangladesh including export cost analysis on green chilli, mango packaging specifications for promoting export to UK market. He was also linked with N-Wave Foods and Authentic Freight System for C&F supports.
Md. Mosharaf Hossain, Partner, Alumni Trading Enterprise, Airport Road, Dhaka (15 July 2014)	As a new exporter, he was given business guidelines for exporting fruits & vegetables to EU. He was also delivered list of exportable horticultural crops in Bangladesh including export cost analysis of green chilli on UK market.
Syed Mainul Hasan Suman, CEO, Basic Effort, Pallabi, Dhaka (16 & 17 Jul 2014)	As a new exporter, provided info about flower (rose) production, PHM, export cost analysis, field pictures (Lincoln variety rose) for trial export to Russia. If export price (C&F) is less than 0.23\$/rose stick, then it will be attractive for Moscow buyer. He was also given technical specifications of reefer container for potato export to Russia.
Mr. Ishraf Hossain, Shams Ishtiaque & Pranto Bhowmick, Pure Farms, Banani, Dhaka (20 July 2014)	As a new entrepreneur of organic food retailer, they were given business guidelines, IFOAM-FiBL2014 country report on organic farming in Bangladesh (written by Hortex officials), list of exportable horticultural crops incl. export status & supply chain management of organic produces.
Md. Khaled Saifullah, Asst. Director, BADC (23 July 2014)	For country paper presentation under APO face-to-face program in Manila, Philippines on GAP, he was given export trends of horticultural crops incl. current status of BanglaGAP & its standard.

<i>Service recipients</i>	<i>Specific service provided by Hortex</i>	<i>Service recipients</i>	<i>Specific service provided by Hortex</i>
Md. Feroz Khan, MD, United Enterprise, New Eskaton Road., Dhaka (06 August 2014)	As a new entrepreneur to involve in agribusiness, he was provided business ideas on quality production of fruits & vegetables under contract farming system for domestic marketing and further export to Saudi Arabia.	Green Farms, Banani, Dhaka-1212 (03 Sept. 2014)	As a new entrepreneur of organically produced vegetables marketing in Dhaka City, they were linked with FIVDB collecting organic produces from their beneficiaries' farmers group from Sylhet.
Mr. Raihan Shafi, Executive, Jute Leaves Project, Toyota Tsusho Corporation, Dhaka Liaison Office, Gulshan (07 August 2014)	He was provided following info on tea for adjustment of jute leaves drying for export to Japan: i. moisture% of fresh tea leaves (before drying): 70-75%, ii. moisture% of dried tea leaves (after drying): 3-3.5%, iii. at first temp. for drying of tea leaves 130 ⁰ C, then 20 minutes travel time, 90 ⁰ C temp. should be followed, iv. drying time 20 minutes for one batch, v. air pressure, adjusted pressure is followed while drying of tea.	Taiwan Food & Processing Industries Ltd, Bhaluka, Mymensingh (03 Sept. 2014)	They were linked with IFST, ICDDR'B and Institute of Food Science & Technology (DU) for chemicals, hormones & pesticides residue testing (Naphthyl Acetic Acid 4.5SL, Ethephon 80% and Auxin + Gibralic Acid) of their processed canned pineapple before exporting as safe for human health as first trial shipment to China through Hortex Foundation support.
Sk. Toufique Mahabub, Director, Mesovision Consultancy Ltd, Dhaka (12 August 2014)	As a new entrepreneur, given business idea on contract farming production and marketing of safe fruits and vegetables to Dhaka City incl. supply to the exporters and further own export where Hortex will provide technical assistance and market linkage development support.	Mr. Nowrose Bin Reja, CEO, Farmers Trade, Mirpur-10, Dhaka (07 Sept. 2014)	As a new entrepreneur on banana supplier in Dhaka City, he was suggested banana postharvest management, supply chain and packaging development for local marketing.
Megumi Hata, Embassy of Japan in Bangladesh (21 August 2014)	As communication, provided flowers info on gerbera, gladiolus, rose prod. status, field pictures, price for export to Japan through Hortex facilitation.	Ms. Bithika Das Hazra & Delwara Khanom, DAI-USAID AVC Project, Dhaka (09 Sept. 2014)	As value chain development in agriculture, they were given data/info on export status of fruits, vegetables & flowers during FY2008-09 to FY2013-14 and export price, cost & margin analysis and export process.
Md. Gazi Ibrahim Babu, CEO, Mediahouse.com, Basaboo, Dhaka (21 August 2014)	As a new entrepreneur entering fruits & vegetables export market, he was given full set of publications, export directory and strategies to export. He was also suggested to supply quality products to the local exporters and super stores.	Mr. Quamruzzaman Babu, MD, Aurora, (Bestec Group) Gulshan, Dhaka (10 Sept. 2014)	He was given data regarding potato area, production, national requirement, export, processing, potential new varieties, price, source of supply, storage facility and scopes of up gradation promoting export from Bangladesh.
Muhammad Shahin, MD & CEO, Sobjibazaar.com Limited, Gulshan, Dhaka (25 August 2014)	As a new entrepreneur for fresh pineapple and vegetables export to Singapore & UK, he was provided postharvest treatment and storage system of pineapple. He was also suggested to develop contract farming system for year round production & supply continuity and quality maintenance as per set standard according to buyer requirement.	Sayedul Islam Mithu, Owner, Swarup Agril, Patgram, Lalmonirhat (16 Sept. 2014)	As a new potato exporter, he was given potato international buyers list and guidelines for exporting potato first time in Nepal. He was linked with Bangladesh Potato Exporters Association for membership.
Md. Imdadul Haque (Rothy), MD, Village Harvest Ltd, Dilkusha C/A, Dhaka (25 August 2014)	As a new entrepreneur for exporting fruits & vegetables to UK, he was given Hortex export directory and set of publications and suggested to explore both domestic and export market opportunities of fresh fruits and vegetables business.	Mr. M. Ahsan Ullah, President, Bangladesh Flowers Growers Exporters Association (BFGEA), Dhaka (22 Sept. 2014)	As per communication between Megumi Hata, Economic Researcher, Embassy of Japan in Bangladesh and Mitul K. Saha, AGM (Marketing), Hortex, one Japanese company interested to import flowers 3 times a week (one time 3000 pieces) from Bangladesh. As such, Mr. Ahsan Ullah was linked with Mr. Kobayashi, Zenith Company Limited, Japan (zenith_co_inc@yahoo.co.jp) for exporting flowers (Rose, Tube rose, Gerbera, Gladiolus) in Japan through Hortex Foundation facilitation.
Gazi Abdur Rahman Aminy, AL-Arafah Islami Bank Ltd., Dhaka (27 August 2014)	He was given export directory and publications exploring fruits & vegetables export and also suggested domestic marketing opportunity of safe food at Dhaka City.	Mr. M N Hoque, Chairman & CEO, Agro Asia Impex Ltd., Naya Paltan, Dhaka-1000 (22 Sept. 2014)	As required for exporting fresh pineapple to Dubai from Bangladesh, he was given technological information on postharvest treatment with waxing and storage of pineapple up to 25 to 30 days during export by sea shipment.
Muhammad Shahin, MD & CEO, SobjiBazaar.com (01 Sept. 2014)	He was given technological info about pineapple postharvest management for exporting to Singapore as fresh. He was suggested an adaptive research is needed on cold storage test of pineapple for studying shelf life increment at different maturity stages applying fungicides, waxing for long distance export market.	Md. Sazzad Hossain, Director, Unison Group, Jhigatola, Dhaka (23 Sept. 2014)	As a new exporter, he was given potato export guidelines including development of contract farming system for producing export quality potato, vegetables, fruits and spices as per buyer requirement.

<i>Service recipients</i>	<i>Specific service provided by Hortex</i>	<i>Service recipients</i>	<i>Specific service provided by Hortex</i>
Kazi Md. Moniruzzaman, Director, K&K Agro, Mirpur, Dhaka (29 Sept. 2014)	As a new entrepreneur, he was provided strategies for entering export market with quality fruits & vegetables. He was also suggested to supply quality fruits & vegetables in domestic market by establishing contract farming system.	Mr. Sohan Lal Saha, Nazirpur, Pirojpur (23 October 2014)	As a new entrepreneur, he was provided guidelines & publications producing quality vegetables and supplying in Dhaka City. He was shared export requirements entering export market.
Mr. Tabriz Ahmed Pathan, MD, BDRUS Trade (Pvt.) Ltd, Dhaka (29 Sept. 2014)	As a new exporter of potato, he was given export cost analysis of potato to Russia, list of exportable fruits, vegetables, frozen & processed food, Hortex article on potato & banana.	Dr AKM Shameem Alam, ADD, Horticulture Wing, DAE (23 October 2014)	As required, he was provided update export status of fruits and vegetables in Bangladesh.
KM Arif Ul Kabir, Sole Owner, Bismillah Corporation (10 October 2014)	As a new exporter, he was provided export guidelines entering Scandinavian countries with cauliflower, sweet gourd, spinach, cucumber. He was suggested to develop contract farming ensuring toxic chemical free vegetables for export.	Mia Abdur Rashid, Director Program, CASEED, Dhaka (28 October 2014)	As required, he was delivered brief info & achievements about Hortex and SCDC of NATP including update export status of fruits, vegetables, potato, frozen food for preparing Hortex strengthening report by Prof. Dr. Zahurul Karim.
Md. Rabiul Islam, CEO, Taj Macro National, Kalabagan, Dhaka (12 October 2014)	As a new exporter, he was suggested business guidelines exporting rice in Australia (2MT/Week) with permission of MOC, GOB. He was given major aromatic rice producing areas i.e. Dinajpur, Sherpur, Naogaon, Chapainawabganj districts.	Saidur Rahman, EON Agro Ind. (29 October 2014)	He was given full set of Hortex publications for promotion of horticultural crops export.
Mr. M N Hoque, Chairman & CEO, Agro Asia Impex Ltd., Naya Paltan, Dhaka-1000 (13 Oct. 2014)	As required for exporting fresh pineapple to Dubai, he was given fungicide Babistin @ 0.2% (2gm/liter of water) info applying at peduncle cutting area before export for protecting pineapple from rotten during sea shipment.	Syed Nazrul Islam (Faruque), Secretary General, BPEA, Dhaka (30 October 2014)	As requirement on local suppliers of chilled shrimps in Bangladesh for exporting mainstream export market in EU, he was linked with Mr. Aksya Kumar Sarkar, Advisor, Mostofa Organic Shrimp Product Ltd, Satkhira.
Md. Abdul Halim, Fruits & vegetables supplier, Savar, Dhaka (14 October 2014)	As a new entrepreneur, he was provided business guidelines exporting toxic free fresh produces in Italy, Bahrain, Japan & Canada by establishing contract farming system and following farm to market approach for export/supply continuity.	Abdallah Naeefy, Advisor, Business Advisory Services, Ernst & Young LLP, India (05 November 2014)	He was provided info regarding fruits & vegetables, processing & cool chain maintenance under Bangladesh Investment Climate Fund managed by IFC in partnership with UKaid and EU aimed at improving business operating environment in Bangladesh.
Ms. Dhanashree Shukla, India (15 October 2014)	As per communication between Mitul K. Saha, AGM (Marketing), Hortex and Ms. Shukla at SATNET program in Thailand, Ms. Shukla (dhanashreeshukla@hotmail.com) exposed interest to import potato from Bangladesh for Russian market. She was given technical specifications of potato info (Diamant, Granola, Asterix, Courage) incl. harvesting season, packaging, quantity & loading port and capacity of year round supply sustainability.	Md. Manjur Quadir, Bhangura, Pabna (16 Nov. 2014)	As a new entrepreneur, he was provided export guidelines for entering into the African countries Botswana, Lesotho with bitter gourd. He was linked with Greentex for joint export to Botswana.
Md. Nazimul Haque, Proprietor, BSTC, Chittagong (15 Oct. & 05 Nov. 2014)	As a new entrepreneur, he was given export cost analysis of green chilli and potato for sending price quotation to his Dubai buyer for importing vegetables and potato from Bangladesh. He was linked with Mysa Corp. for export quality packaging development.	Md. Shoriful Islam, Jessore (17 Nov. 2014)	As a new producer of fruits, vegetables & flowers, he was provided advisory services for producing quality & safe produces for supplying to exporters and Dhaka City adopting contract farming.
Mr. Raihan, Toyota Tsusho Corporation, Dhaka (22 October 2014)	During visit of the Delegation of the Ministry of Textiles and Jute to Japan, he was linked with Bangladesh Jute Mill Corporation (BJMC) promoting jute leaves and explores jute based products in Japan from Bangladesh.	Major Abdullah, Mirpur Cantonment, Dhaka (17 Nov. 2014)	He was provided National Agricultural Policy for preparing his research assignment for Govt. Staff College. He was also given info on constraints and opportunities in agriculture sector for promoting agribusiness in Bangladesh.
		Akiko Sugimoto, JICA Intern, Bangladesh Office, Dhaka (17 Nov. 2014)	She was given info about fruits & vegetables processing, postharvest and supply/value chain management of agro-commodities to make their proposal for new JICA's project in agribusiness sector to develop Bangladesh.
		Mir Md. Miraz, Director, Captains Group, Gulshan, Dhaka (18 Nov. 2014)	As a new exporter, he was provided advisory services entering into export market of UK, Malaysia, Dubai, Brunei with quality vegetables and fruits adopting contract farming. They already developed a mango orchard in Bandarban for quality production and marketing.

Service recipients	Specific service provided by Hortex
Ataur R. Kamal, CEO, Al-Kamal & Company, Bhairab, Kishoreganj (01 Dec. 2014)	He was suggested to chilli export by sea shipment maintaining Temperature +7 to +10°C, Ventilation (air exchange 10 to 15 cbm/h), RH 90 to 95%, Dehumidification OFF and approximate shelf life (in ambient air) 2 to 3 weeks.
Abdul Hamid, MD, Tridhara Banijya Sangstha Ltd, Dhaka (10 Dec. 2014)	He was provided export guidelines for exporting vegetables (teasel & pointed gourd, stolon of taro, lemon, eddo, cabbage) to the Malaysian market as a new exporter.
Jamil-ur-Rahman & other 09 Students of IBA, University of Dhaka (11 Dec. 2014)	For conducting research on Strategic Roadmap for Global Market Entry of Bangladesh Horticulture Crops by BBA 19 th batch, they were given production, export and value chain info about mango, pineapple, cucumber, potato, spices. And also provided possibilities of processed products, organic farming and intervention strategies for safe food production and marketing in Bangladesh.
Md. Shohrab Hossain, Square Food & Beverage Ltd, Dhaka (11 Dec. 2014)	As per MOU between Hortex & Square, he was provided banana cost of production for developing production plan, banana chips production and marketing through Hortex support.
Sarwar Sayeed, Alam International, Dhaka (11 Dec. 2014)	As a new producer of vegetables in Narshingdhi, he was given business guidelines for supplying quality vegetables to the exporters and exporting vegetables and potato in Malaysia.
Ershad Ahmed Bhuiyan, Taiwan Food & Processing Ind. Ltd., Bhaluka, Mymensingh (30 Dec. 2014)	As first time canned aloe vera export to China, Taiwan and Hong Kong, he was provided seven contact addresses of crude medicinal herbs suppliers for direct communication to purchase export quality aloe vera from them.
Mr. M. Ahsan Ullah, President, BFGEA and Proprietor, Ahsan Associates, Dhaka (31 Dec. 2014)	As per first trial export of flowers to Zenith Company Limited, Japan through Hortex facilitation, he was provided details export cost analysis of rose in Japan i.e. 9.06\$/kg C&F (if 01kg=25-30 piece of roses) and 8.80\$/kg C&F (if 01kg=35 piece of roses) where airfreight charge 3.99\$/kg.

Adaptive research support on pineapple export

Mr. Muhammad Shahin, MD, SobjiBazaar.com Limited, Gulshan, Dhaka is interested to export fresh pineapple (*Var. Giant Kew and Honey Queen*) from Bangladesh to Singapore, UK and different European Countries in a refrigerated container. He requested Hortex for arranging a study assessing shelf life of pineapple at different maturity stages of harvest. Hortex requested DG, BARI to conduct such study and the Postharvest Technology Division of Bangladesh Agricultural Research Institute has been conducted an experiment to process fresh pineapple by applying fungicide, waxing materials and cold storing in appropriate cartons using 0.04 mm

thickness polypropylene bag to maintain freshness, firmness, color and overall acceptability for long distance export. 15 boxes pineapple used in this experiment were off-season 'Honey Queen' variety and collected jointly by PHTD of BARI, Sobjibazaar.com Limited and Agro Asia Impex from Naniarchar, Rangamati on 22 Oct. 2014 with the financial support of Hortex Foundation facilitated by AGM (Marketing), Hortex Foundation.

The treatment combinations of Iprodione @ 0.05% and Sta-fresh 2952 wax @ 60 g/l was more effective in alleviating chilling injury which delayed the changes in firmness flesh color and weight loss as compared to the control fruits. The combination of the above mentioned treatments also decreases titratable acidity and total soluble solid when compared to those in control fruits. This fungiciding and waxing also improved total sugars and ascorbic acid content in pineapple fruit and maintained the fruit quality and shelf life for 3 weeks of storage at 110C and 88+_2% RH. The pineapples were successfully stored for 3 weeks maintaining its freshness and quality.

Hortex stall at Food Fair 2014



Hortex Foundation participated in a three days long Food Fair-2014 (*World Food Day, Theme: Family Farming: Feeding the World, Caring for the Earth*) jointly organized by Ministry of Agriculture, GOB and FAO during 16-18 Oct. 2014 at BARC, Farmgate, Dhaka. Matia Chowdhury MP, Hon'ble Minister, MOA, GOB inaugurated the Fair as the Chief Guest while Md. Sayedul Haque, Hon'ble Minister, MOFL and Kbd. Md. Abdul Mannan MP as the Special Guests, Mr. Mike Robson, FAO Country Representative in Bangladesh as the Guest of Honor, different Govt., private agencies and foreign officials were present at the inaugural session of the event. Hortex Foundation raised a stall in the Fair and displayed exportable fruits, vegetables and processed agro-commodities that created immense interest of the visitors promoting export. The Ministers paid a visit to the Hortex Foundation stall. From Hortex stall, different technical bulletins, booklets, leaflets were disseminated among the visitors for knowledge sharing promoting agro-commodity export from Bangladesh.

Hortex stall at 4th Agro Bangladesh Expo-2014



Hortex Foundation participated in the 4th Agro-Bangladesh Expo-2014 held on 11-13 Sept. 2014 at Bangabandhu Int'l Conference Centre (BICC), Sher-e-Bangla Nagar, Dhaka and raised a stall in the Expo. Mr. Tofail Ahmed MP, Hon'ble Minister, Ministry of Commerce as the Chief Guest, Matia Chowdhury MP, Hon'ble Minister, Ministry of Agriculture, GOB as the Special Guest, different Govt., private agencies and foreign officials were present at the inaugural session of the event. At Hortex stall, a good number of exportable fresh fruits, vegetables, processed agro-commodities, Hortex-SCDC publications were displayed and distributed booklets, leaflets among the visitors free of cost.

Hortex supported mango export to ASDA, UK



AGM (Production), Hortex Foundation facilitated 45kg of hot water treated mango (nine varieties) trial export to Walmart, ASDA Chain Shop, UK through local exporter M/S. Dip International. Walmart accepted three varieties (Langra, Himsagar and BARI Aam-3) of mango for import in next season from Bangladesh under FAO-FSP.

Supported canned pineapple export to China

In the history of Bangladesh, canned pineapple (var. Giant Kew) was exported from Bangladesh facilitated by AGM (Marketing), Hortex Foundation through Taiwan Food & Processing Ind. Ltd., Bhaluka, Mymensingh on 19 October 2014. In the first shipment, 4 types of canned pineapple i.e. weight of 3kg, 850gm, 560gm & 465gm



were exported to China with total volume of 17.71 MT. Meanwhile, Hortex requested EPB, MOC, GOB (Ref: Hortex-Marketing/EPB/June2013-470, dated 20Jun.2013) for inclusion of canned pineapple, baby corn, aloevera products under cash incentive support promoting export.

Hortex supported flowers export to Japan



In 08 Dec. 2014, AGM (Marketing), Hortex Foundation facilitated to trial export of 5.5kg (gerbera, gladiolus, rose, tube rose 10 pc's each and some orchids & lemon grass) flowers to Zenith

Company Inc, Japan through Mr. M. Ahsan Ullah, Proprietor, M/S. Ahsan Associates, Dhaka by Malaysian Airlines using 2.26 cft areas (equivalent to 10kg weight) @ BDT 3200/2.26 cft packaging areas. Meanwhile, packaging development, airfreight among others cost was borne by Hortex Foundation for promoting flowers export from Bangladesh.

Expert meeting on NTF for organic farming

Hortex Foundation organized 8th expert meeting of National Task Force (NTF) for Organic Farming in Bangladesh held on 20 July 2014 at its conference room to discuss proposed National Organic Policy and Standards, Co-opt Members in NTF and Mr. Andre Leu, President, IFOAM visit in Bangladesh on Aug. 06-11, 2014. The meeting chaired by Mr. M. Ahsan Ullah, Convenor, NTF & Director, Governing Body, Hortex Foundation where 12 participants attended the meeting. In the meeting, one new member was co-opt at NTF namely Ms. Ayesha Dada as representation from the livestock sub-sector.

Exporters' consultation with Prof. Dr Z. Karim

Hortex Foundation organized a consultation between Prof. Dr Zahurul Karim and exporters of fresh & processed agro-commodities held on 21 Oct. 2014 at its conference room Chaired by Dr Md. Abdul Jalil Bhuyan, Managing Director, Hortex where 19 participants attended. Exporters shared their experiences and problems during exporting of different agro-commodities like pineapple, vegetables,



potato, betel leaves, aromatic rice, mustard oil, spices, puffed rice and given their valuable suggestions to overcome the problems especially strengthening Hortex Foundation for receiving more services that ultimately promoting export. The meeting was organized in part of short-term consultancy regarding institutional & capacity assessment of Hortex Foundation as World Bank decision under Service Package: SD/PCU-37/1 of NATP (Phase-I).

Inter-Ministerial meeting on organic policy



An Inter-Ministerial meeting on National Organic Policy & Standards as proposed by the National Task Force (NTF) of Organic Farming in Bangladesh held on 20 October 2014 at 2.30pm at Ministry of Agriculture Conference Room, Bangladesh Secretariat Chaired by Dr S M Nazmul Islam, Secretary, MOA, GOB and Chairman, Hortex Foundation where 16 participants attended. Crop, Aquaculture and Livestock draft organic policy and standards were discussed and decided to prepare three policies and standards in line with the National Agriculture Policy-2013.

Workshop on export of horticultural crops

Hortex Foundation in collaboration with SCDC of NATP organized National Workshop on “Exports of Horticultural Crops in Upstream Markets: Challenges and Opportunities” held on 22 Dec.2014 at its conference



room Chaired by Dr. Md. Abdul Jalil Bhuyan, Managing Director, Hortex. Mr. Shubhashish Bose, VC, EPB was present as the Chief Guest while Md. Mosharaf Hossain, Joint Secretary (Extension), MOA, GOB and Dr. Abul Quasem, Ex. MD, Hortex as the Special Guests. Four technical papers were presented highlighting export promotion of horticultural crops in Bangladesh. Total 44 participants attended in the workshop.

Certified master trainer training programme



Hortex Foundation in collaboration with FAO-Food Safety Programme (FSP) and DAE jointly organized Certified Master Trainers Training Programme on Food Control in Horticulture Value Chain held on 22-27 November 2014 at GUM conference centre, DAE, Dhaka. Dr. John Ryder, FAO-FSP welcomed the trainee of DAE, BARC and Hortex officials. Dr. Mike Dillon, the Institute of Productivity & nocn, UK conducted the training highlighting COPs of five key germs and chemicals ensuring master trainers have the knowledge and skill in food control for supporting change in food supply chain, to motivate small farmers to change their farming practices and to grow safer produces. AGM (Marketing), Hortex presented the wrap-up presentation on findings of field visit and COPs on chemicals. Prof. Dr Mike Dillon awarded Group-5 headed by Mitul Kumar Saha, AGM (Marketing), Hortex as the most productive group in six day long certified master trainer training programme.

Major workshop/seminar/meeting participation

During the period July-December 2014, Hortex officials attended a number of seminars, workshops, trainings and discussion/policy meetings. Some of them are as follows:

- (i) In 03 July 2014, meeting held at MOA on balanced fertilization produces higher yield project implemented by Prodiptorg, Russia chaired by Mr. Swapan Kumar Saha, Addl. Secretary, MOA, GOB.
- (ii) Meeting held at Hortex on 09 July 2014 with GTS Logistics, Dhaka highlighting 500kg safe & fresh pineapple trial export to Malaysia & Turkey.
- (iii) AGM (Marketing), Hortex visited banana garden at Barekpara, Sherpur Sadar, Sherpur on 28 July 2014 to see the production status and opportunity for direct marketing in Dhaka City.
- (iv) AGM (Marketing), Hortex attended banana farmers meeting held on 31 July 2014 at Ramkrishnapur, Sherpur Sadar, Sherpur organized by Radical Agro Industries where 17 farmers attended. AGM (Marketing) shared experiences on modern banana farming practices maintaining better quality, yield and supply chain management as followed by Philippines farmers. Then, poly capping demonstration was held at Mr. Shafiqul Islam garden's to control banana beetle at flowering stage.
- (v) AGM (Marketing), Hortex visited Khunua village, Sherpur Sadar, Sherpur on 01 August 2014 to see tomato production field considering project areas under FAO-FSP.
- (vi) Meeting held on 07 August 2014 with Mr. Winston Kao, Chairman, Taiwan Food & Processing Industries Ltd. highlighting to solve problem of canned pineapple during processing for export.
- (vii) Workshop on Patronization of Organic Sector in Bangladesh Field to Market held on 10 August 2014 at GUM Auditorium, DAE jointly organized by BOPMA and APBPC, MOC. AHM Mustafa Kamal MP, Hon'ble Minister for Planning, GOB was present as the Chief Guest. Mr. Andre Leu, President, IFOAM was present as the Guest of Honour while Mu. Abdus Salam, President, BOPMA presided over the event.
- (viii) Meeting held on 14 August 2014 at MOA, GOB regarding potato export problem in Russian market due to brown rot under Chairmanship of Mr. Anwar Faruque, Additional Secretary and DG, Seed Wing, MOA. The meeting discussed strategies for urgent intervention solving the problem of *Ralstonia solanacearum*. The meeting formed an 11-Member Committee headed by MD (Crops), BARC preparing action plan to solve brown rot disease.
- (ix) Hortex Foundation arranged exposure visit in favor of Radical Agro Industries (Sherpur) to Mokumtala, Bogra to see the SCDC of NATP interventions on banana production & marketing and uses of poly capping, washing and ripening chamber.
- (x) AGM (Marketing), Hortex attended sub-committee meeting headed by MD (Crops), BARC held on 19 August 2014 at BARC highlighting draft action plan solving potato export problem in Russia due to brown rot. Hortex Foundation submitted a written action plan to the MD (Crops), BARC.
- (xi) Meeting held on 25 August 2014 at MOA Chaired by the Secretary, MOA, GOB highlighting fruits & vegetables, potato and betel leaf action plan.
- (xii) As per MOU, meeting with SCPL (now Square Food & Beverage Ltd) held on 03 Sept. 2014 at Hortex highlighting commercial production of Chilli (dry), Turmeric, Coriander, Pulses, Aromatic Rice, Seed Potato at their own 100 acres land at Panchagar. The meeting suggested preparing a work plan/business plan right from soil test/land preparation adopting GAP and marketing strategy both at domestic and export markets.
- (xiii) Consultation workshop on "Strengthening of Hortex as a Center of Excellence for Value Chain Development & Transformation of Commodity Collection & Marketing Centers (CCMCs) into Rural Business Centers (RBCs) held on 07 Sept. 2014 at Hortex organized by SCDC of NATP. Dr. Md. Abdur Razzaque, PD, PCU, NATP-1 presided over the event. Dr. Md. Abdul Jalil Bhuyan, MD, Hortex welcomed the participants while Mr. Patrick Verissimo, Task Team Leader, NATP, World Bank attended the workshop as the Guest of Honor. Total 40 diverse participants attended the workshop.
- (xiv) Stakeholders' consultative meeting on Need Assessment and Strategy for Capacity Building in Pesticides Management for Improving Food Safety in Bangladesh held on 11 Sept. 2014 at Hortex jointly organized by USDA, FAO-FSP and Hortex Foundation. The workshop inaugurated by Mr. Mike Robson, the FAO Representative in Bangladesh and moderated by Dr Luis Sugiyama, EPA. 33 participants were attended in the event.
- (xv) Meeting held on 14 Sept. 2014 at Hortex with Dr Mike Dillon, Senior Int'l Consultant, Value Chains & Food Safety, FAO-FSP to design training programme to be implemented by Hortex and mango trial export to UK.
- (xvi) Meeting held on 29 Sept. 2014 chaired by Mr. Anwar Faruque, Additional Secretary and DG, Seed Wing, MOA, GOB highlighting implementation of potato action plan for Russian market.
- (xvii) Farmers meeting organized by AGM (Marketing), Hortex held on 07 Oct. 2014 at Betmari, Rashidpur, Sherpur Sadar Upazila, Sherpur to identify 20 potential farmers for safe tomato production and marketing under FAO-FSP. 09 farmers attended in the meeting.
- (xviii) Meeting with Dr John Ryder, FAO-FSP held on 15 Oct. 2014 on Letter of Agreement (LoA) between Hortex and FAO implementing the sub-project.

- (xix) Meeting with Syed Nazrul Islam (Faruque), GS and Md. Zahirul Islam Khan, OS, Bangladesh Potato Exporters Association held on 28 Oct. 2014 at Hortex highlighting potato export to Russia and provided list of world top 40 potato importing countries and four exportable potato varieties specifications for promoting export.
- (xx) Meeting held on 28 Oct. 2014 with Ms. Catharien and Fida Haq on G4AW project to the Netherlands Space Agency at Wageningen University & Research project office at Mohakhali DOHS, Dhaka.
- (xxi) Meeting held on 29 Oct. 2014 with Natural BioAgro Tech Co (Pvt.) Ltd. at Hortex highlighting to promote organic plant hormone PRH. Mr. Hiroto Tozawa, Chairman, CUORE Planning Co. Ltd, Japan and Mr. Mustafizur Rahman, Chairman, Natural BioAgro Tech Co (Pvt.) Ltd., Bangladesh attended.
- (xxii) Inter-Ministerial meeting held on 10 Nov.2014 at MOC chaired by Hon'ble Minister, MOC, GOB highlighting decontamination of fruits & vegetables, betel leaf, potato for exporting to the EU & other countries and formed high power five members committee.
- (xxiii) In 11 Nov. 2014, Hortex organized an expert consultation with consortium partners regarding submission of proposal at the Netherlands Space office under programme of the Dutch Ministry of Foreign Affairs on Geodata for Agriculture and Water facility (G4AW) project chaired by MD, Hortex where 12 participants attended from six organizations. The meeting discussed about G4AW project and to prepare short proposal.
- (xxiv) Meeting held on 12 Nov. 2014 with Dr. Kerstin Hell, UK highlighting PH losses of vegetables in Bangladesh and strategies for reduction.
- (xxv) Meeting held on 17 Nov. 2014 with Dr. S P Ghosh, PD, SCDP, DAE highlighting supply chain management areas of SCDC of NATP for preparing short concept note on SCDP-3rd phase to be financed by ADB & GOB.
- (xxvi) Workshop held on 23 Nov. 2014 organized by PCU, NATP (Phase-I) where Prof. Dr Zahurul Karim presented the keynote paper on institutional & capacity assessment of Hortex Foundation.
- (xxvii) Meeting held on 30 Nov. 2014 with Dr. Ir. Monica Altamirano (Deltares),NL, Mr. Bastiaan Raos (Nelen & Schurmans) and Mr. Farook Chowdhury, Country Director, Mott MacDonald highlighting to use satellite data/images for crops and floods forecasting, policy making, monitoring, disaster risk management, crop management, info for markets, early anticipation on changes/disruptions, hazards and water distribution among the users of Govt., research institutes, irrigation, microfinance & insurance, food industry, Donors, projects, NGOs, IT companies and large farmers.
- (xxviii) Workshop on need assessment of selected horticulture centers of DAE held on 04 Dec. 2014 at SAC organized by PCU, NATP-I chaired by Dr. Md. Abdur Razaaque, PD, PCU, NATP-I.
- (xxix) Meeting held on 07 Dec.2014 at EPB chaired by VC, EPB highlighting to prepare action plan and measures to be taken for controlling *Salmonella spp.* of betel leaves, interception of fruits & vegetables to EU countries and brown rot of potato regarding video conference between GOB & EU delegation.
- (xxx) National Workshop on Transferable Technologies of the NARS Institutes for Sustainable Food and Nutrition Security held on 24-25 Dec.2014 at BARC organized by TTMU, BARC chaired by Dr. S M Nazmul Islam, Secretary, MOA, GOB. Matia Chowdhury MP, Hon'ble Minister, MOA, GOB was present as the Chief Guest in the event.

SATNET Asia Interregional visit in Thailand



The Centre for Alleviation of Poverty through Sustainable Agriculture (CAPSA) and the Trade and Investment Division of United Nations ESCAP jointly organized 'SATNET Asia Interregional Visit for Smallholder Value Chain Actors on Agricultural Trade Facilitation and Market Linkages' (23-25 Sept. 2014) and the 'SATNET Asia Workshop on Good Practices in Agricultural Trade Facilitation in South and Southeast Asia' (26 Sept. 2014) held in Thailand. The event provided practical exposure to key stakeholders in South and Southeast Asia to good practices and technologies in agricultural trade facilitation and the development of market linkages as a means to address food security and poverty reduction, and involved site visits in Bangkok and neighboring districts. Participants from Bangladesh, Bhutan, Cambodia, India, Lao PDR, Myanmar and Nepal including representatives of the Ministries of Commerce and Agriculture, small-scale agri-business operators, industry associations concerned with agricultural trade and marketing, farmer associations and smallholder cooperatives engaged in exports were participated. Mitul Kumar Saha, AGM (Marketing) attended the event from Hortex Foundation, Dhaka, Bangladesh.

TOT workshop on agrifood products, Thailand



Regional “Training of Trainer” Workshop on Trade Facilitation and Paperless Systems for Agrifood Products held in the UN Conference Centre, Bangkok, Thailand from 15-17 December 2014 where Mitul Kumar Saha, AGM (Marketing), Hortex attended sponsorship from UNESCAP and presented country paper on status of agricultural trade facilitation² and paperless trade measures for agrifood products. Purpose of the workshop were to strengthen the capacity of regulatory agencies and other stakeholders involved in agricultural and food products trade to participate in and implement paperless systems aimed at facilitating trade and enhancing the international marketability of agrifood products. Participants attended from 9 countries (Bangladesh, Bhutan, Cambodia, India, Lao PDR, Myanmar, Nepal, Sri Lanka and Vietnam).

Mr. Saha, AGM (Marketing), Hortex highlighted in his country paper that Bangladesh achieved self-sufficiency in food grain but yet a lot of supports are needed for transforming subsistence agriculture towards commercial farming. Government of Bangladesh is attaching high importance for the production and export of high value agro-commodities through diversification of produces and market promotion. But there are a number of problems facing the small and marginal farmers. There is a strong demand for investment in the sector for development of market and value chains, postharvest loss minimization, promotion of contract farming & group marketing, transportation and storage facilities, capacity development for food quality & safety, speed up dissemination of technology and enhancing institutional capabilities delivering essential services to the small farmers, traders, exporters and different supply chain actors for developing demand led value chains and improving agricultural trade facility and market linkages of the smallholder farmers for promoting agro-commodities export.

²Agricultural trade facilitation is defined as the simplification and harmonization of procedures (activities, practices and formalities) involved in the import and export of agricultural and food products, including but not limited to collecting and processing data and documents required for the cross-border movement of these products.

Highlighted activities under SCDC of NATP

Supply Chain Development Component (SCDC) of National Agricultural Technology Project (NATP) implemented by Hortex Foundation has carried out 10 (ten) training programs in different aspects on selected agro-commodities and management practices for developing supply chain in the project sites during the period July-December 2014. A total of 400 different stakeholders were participated in the training programs including 375 CIG farmers, 02 SCDOs, 02 LEAFs, 11 SAAOs and 10 MMC Members of CCMCs. Out of 400 participants trained, 355 were male and 45 female.

SCDC of NATP, Hortex Foundation conducted 02 (two) workshops for sharing knowledge among the distinguished participants. A total of 100 different stakeholders were participated in the workshops including SCDC Experts, Hortex officials, Universities, PD & NCs of PCU, Directors & Experts of PIUs of NATP, FAO, PPW, DAE, Private Company, BFVAPEA among others. Out of 100 participants 95 were male and 05 female.



During the reporting period, SCDC of NATP, Hortex Foundation attended Agro-Tech Fair 2014 at Parbotipur upazila of Dinajpur district for expanding SCDC activities in selected upazilas for marketing of CIG produces and improving quality and shelf life of agro-commodities in the supply chain. Advocate Mostafizur Rahman Fizar MP, Hon’ble Minister for Primary and Mass Education, GOB had paid a visit to the SCDC of NATP, Hortex stall.

SCDC of NATP, Hortex success story - 7

Mr. Moniruzzaman, model vegetable farmer in Comilla

Mr. Moniruzzaman, Deputy Team Leader, Common Interest Group (CIG) of Comilla Sadar Upazila has encouraged other farmers as the model vegetable producer of Comilla. Now, he is the owner of 0.2 acres of land, three cows, four goats and set an example in his area for managing successfully low cost vegetables farm. He was one of the farmers, who have gone through the intervention in Comilla Sadar for promoting some selected

varieties of quality seeds by adopting improved management practices, better know-how training and developing appropriate marketing system for selling the vegetables to the Commodity Collection and Marketing Centre (CCMC) under SCDC of NATP implemented by Hortex Foundation.

Mr. Moniruzzaman lives in Hatigara village, Sadar upazila of Comilla district and has started vegetables farming business since 2000 in his own 30 decimals of land. But due to high pests/insects infestation, he was failed to grow quality and safe vegetables. He was frustrated by using commonly used pesticide/insecticides available in the market. As a result, his life was very unhappy due to continuous failure of earning sufficient money to run his family. In the meantime in 2009, he was selected as one of the member of CIG and further he was trained by the SCDC of NATP, Hortex Foundation on using of modern techniques for quality vegetables production, marketing and overall farm management. By receiving the trainings from SCDC, Hortex he increased his capacity and knowledge on proper vegetable farm management and as a result, vegetable production of his farm has been increased and pest attack including other management problem has been decreased.



As per Hortex intervention, all the CIG members in collaboration with SCDC of NATP have been established a CCMC at Raicho Bazar, Comilla Sadar Upazila. CIG farmers were collected vegetables from their fields for selling to the CCMC traders with the group marketing approach. By using group approach, they reduced their transportation cost and received good price by applying sorting, grading and using plastic crates which keep the quality of vegetables well and fresh.

As part of the activity, SCDC of NATP, Hortex Foundation arranged important training program on proper production, postharvest management, supply chain management and marketing of winter & summer vegetables, technological intervention for safe vegetables production & marketing etc. Mr. Moniruzzaman attended SCDC organized all training programs along with other CIG farmers. After having trained by SCDC, he started for using pheromone technology to protect his bitter gourd field from pest/insects infestation. For safe vegetables production and marketing, he received different

equipments/accessories like plastic crates, mat, containers etc. from SCDC of NATP, Hortex Foundation.

Mr. Moniruzzaman produced good quality different vegetables worth of Taka 125000.00 from his farm and by selling this at the CCMC and he earned Taka 71200.00. In recent years, he accumulated a capital of Taka 0.7million from his earning and he bought 0.25 acres of land and also leased 2.5 acres of land for commercial farming of vegetables. This result of making successful production and marketing of vegetables through CCMC with premium prices and improved livelihood of Mr. Moniruzzaman motivated other CIG members to move forward.



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