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# Approach to Enhancing Nutritional Security with Safe Vegetables and Fruits in Bangladesh

**PROCEEDINGS OF THE CONSULTATION WORKSHOP**

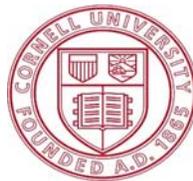
At

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Prepared for

**HortCRSP** 

**Horticulture Collaborative Research Support Program**



## INTRODUCTION

Horticultural products with high nutritive value are considered to be a vital component of a diversified and nutritious diet. They become all the more important for nations like Bangladesh where highly prevalent malnutrition makes nutritional security an important public health concern. While it is possible to address malnutrition by including horticultural produce in the daily diet, it is equally important to make the quality and safety of such food, a prime concern.

The horticultural sector in Bangladesh faces critical food safety problems that seriously impact food quality. Major issues include significant post harvest losses, lack of knowledge about good agricultural practices (GAP) and good handling practices (GHP), and inadequate market infrastructure, and water contamination. As a result of these, the fresh produce reaching the consumer exhibit serious microbial and toxicological contamination that result in cases of food borne illnesses that manifests more significantly in the underprivileged community owing to their inability to access modern retail.

It is understood that interventions for the horticultural sector development in Bangladesh can lead to effective reduction in the incidence of food borne diseases and ensured nutrition intake for the people. In addition, resource poor farmers and their families can engage in horticultural farming on their small land holdings, thereby providing them with an additional source of income.

The Government of Bangladesh has identified food safety in horticulture crops as a key area requiring immediate strategic interventions. To address this issue, the Bangladesh Mission and the Bangladesh Agricultural Research Institute (BARI) approached USAID with seven key objectives: crop yield improvement, seed delivery system, post harvest technology, food safety and adoption of GAP, food processing and value addition, market linkage, and extension education.

This led to the conceptualization of a project under HortCRSP in Bangladesh that brings together BARI, Cornell University, University of California Davis and Sathguru Management Consultants. While the lead partners will engage in implementing the project and exploring technological solutions to address major issues, many public and private institutions within Bangladesh will also be united with the partners in this initiative on a need basis.

In view of the fact that the efforts to realize these objectives may not begin together, farm level food safety and adoption of GAP was considered to be a near term priority, with other objectives forming part of the long term plan. To address food safety in horticulture, a two phase approach was adopted, with the first phase dedicated for planning and the second phase for execution.

As part of the first phase, in May/June, 2011, meetings with key stakeholders were planned in Bangladesh to understand the ground level food safety situation. The findings were well documented in a background note for discussions during a subsequent consultation workshop that was held in Dhaka in August, 2011 to

collectively develop action plans for the second phase. This document is a compilation of the proceedings of the August workshop in Dhaka.

## **WORKSHOP PROCEEDINGS**

### **POLICY FOCUSED SESSION**

On 16 August, 2011, under the aegis of the USAID funded Horticulture Collaborative Research Support Program (HortCRSP) initiative, a three day workshop on “Approach to Food Safety for Vegetables and Fruits in Bangladesh” was attended by many dignitaries from government, NGOs, academia, and industry. The workshop commenced with a session on food policy in Bangladesh. All the speakers highlighted the importance of engaging in the horticulture sector to address nutritional security in Bangladesh.

In his welcome address, Dr. Md. Rafiqul Islam Mondal, the Director General of BARI, emphasized the immediate need to reduce levels of post harvest losses in horticulture produce and improve food safety. He ensured those gathered that BARI was committed to developmental activities of this nature and will extend its support to such interventions.

The Deputy Mission Director of USAID in Bangladesh, Dennis Sharma, in his opening remarks, spoke of the major objectives for the overall horticulture plan and emphasized the current project engagement for food safety and good agricultural practices (GAP) as a priority objective, and the activities undertaken so far. Following this, Ronnie Coffman, Director - International Programs, CALS, Cornell University, provided an overview of various developmental projects in the agricultural sector lead by Cornell University in Bangladesh, with special emphasis on the food safety and the potential impacts of interventions there under.

Dr. K. V. Raman of Cornell University, as a representative of the HortCRSP, gave an introduction to HortCRSP projects that leveraged the science and technology expertise available in US universities for developmental activities in emerging economies around the world. In continuation, K. Vijayaraghavan from Cornell University and Sathguru described the key objectives of planned initiatives for the overall development of the horticulture sector as part of the HortCRSP mission in Bangladesh.

While addressing the participants, the chief guest, Begum Matia Chowdhury, Honorable Minister for Agriculture, Government of Bangladesh, flagged the development of horticulture as a potential means to address the problem of malnutrition in Bangladesh by ensuring that the fresh produce remains free from microbiological and chemical contamination both on farm and off the farm at all stages of the value chain. She also conveyed her appreciation of the project and the activities planned under its umbrella.

The inaugural session formally closed with concluding remarks by Dr. Wais Kabir, Executive Chairman of the Bangladesh Agricultural Research Council (BARC), followed by a vote of thanks from Shirazul Islam, Director Research at BARI.

## **THEME BASED SENSITIZATION SESSIONS ON KEY ISSUES**

A major goal of the workshop was to cover food safety in the horticulture value chain right from the farm level through to the markets, and highlighting the alarming issues that affect food quality at each step in the value chain. Considering this, various technical sessions were planned for the workshop as part three major themes namely

1. Farm level production issues impacting safety
2. Food safety related impacts on health
3. Food safety policy issues

During the workshop many technical sessions with appropriate focus under each thematic area was planned to comprehensively cover and discuss key food safety issues in horticulture value chain. These technical sessions were facilitated by faculty from within Bangladesh as well as international institutions. A brief description of the technical sessions for each theme are provided hereunder, along with the discussions that occurred and the suggestions provided by participants on ways to effectively deal with these issues. The action points that were planned and unanimously endorsed by the stakeholders are also described. All the themes were selected in accordance with the country priorities.

### **FARM LEVEL PRODUCTION ISSUES IMPACTING SAFETY**

#### ***Technical session 1: Overview of farm level food safety issues in horticulture***

An overview of the major horticulture crops grown in Bangladesh, their importance in terms of ensuring that nutritional requirements are met and food security is established, and the need for food safety in horticulture was provided. Issues and constraints such as the use of outdated technology, limited knowledge of GAP, poor quality of agricultural inputs, use of contaminated water for irrigation and washing, high pesticide and chemical usage, lack of knowledge on food safety among the stakeholders, back dated laws and regulations were listed as some of the challenges that needed to be addressed. While highlighting these constraints, the presentation also flagged various opportunities and existing strengths that could be leveraged, which includes favorable agro climatic conditions, the infrastructure available at BARI and the presence of qualified scientists.

#### ***Technical session 2: Deriving benefits by introducing GAP in horticulture***

The quantum of export of various fruits and vegetables from Bangladesh was used to describe the demand variation observed over the past few years. In addition, various potential sources of high level microbial and chemical contamination that adversely impact food safety and security were highlighted. An overview on GAP that touched upon the concept of GAP, benefits of GAP in ensuring high quality safe food, vital components of GAP, major challenges in GAP implementation and the ultimate enhanced economic gains to stakeholders through GAP implementation was also provided. The need for the development and implementation of a

BanglaGAP was emphasized, along with policy level interventions and relevant training towards this across the value chain.

### **Technical session 3: Identifying and mitigating toxicological and microbial contaminants**

The difference between quality and safety of food products, spoilage due to microbes, and key sources of microbial contamination (soil/animals/people) was explained. The points of origin for microbial contamination at the pre harvest, harvest, and post harvest levels, the importance of using safe water at all phases of produce handling and the importance of having a pack house facility close to the farm were emphasized. Many potential causes of contamination, such as non use of gloves, lack of toilet hygiene, and the poor health of the workers during the harvesting/processing stage were flagged. Illustrations of microbial food spoilage in fresh produce, the mechanism by which bacteria attach themselves to food products and the process of microbial transmission through soil, water and air helped the audience identify key areas for food safety interventions. It was emphasized that even a small number of microbes are capable of making a person ill as they multiply quickly in a conducive environment, and for this reason can cause very serious damage to human health if not properly monitored and controlled. The incubation period of many harmful bacteria is several days making it difficult to identify the source of contamination after the outbreak. Constant surveillance is thus the ideal way to deal with the problem.

#### **Discussions:**

The three presentations highlighted and triggered discussions on key food safety issues in horticulture at the farm and market levels; the need for GAP development; and the implementation of GAP to address food safety issues. Participants discussed potential problem areas, the impact of GAP on cost of production and yield, priority areas for GAP implementation, and GAP related training needs. Ideas that emerged from these discussions are listed below under the relevant heads:

#### ***Problem areas***

- Certain concentrated pockets in Bangladesh exist where crops are more prone to contamination, such as chemical contamination in parts of north and south Bangladesh and areas close to industrial run offs. Regions with hot and humid environments exhibit a high incidence of microbial contamination and disease.
- Major sources of contamination include non judicious use of agro chemicals, poor quality seeds, contaminated surface water used for irrigation and washing, improper food handling, and technical breakdowns in the food value chain.

### ***Impact of GAP on cost of production***

- Cost of production increases with GAP implementation primarily due to expenses relating to record keeping and certification. However, the crop yield increases with appropriate application of agricultural inputs to the crop. Since GAP produce is sold at a premium price, this compensates for the increased cost of production and also leads to increased income for the farmer.

### ***Priorities for GAP implementation***

- Since international GAP standards are considered to be very stringent and difficult to adopt during the initial stages of its implementation, a BanglaGAP could be developed taking into consideration the local conditions. This BanglaGAP could then be gradually harmonized with the GlobalGAP.
- Regulatory enforcement may not be required at the early stage as only a few important features of GAP need to be implemented to satisfy consumers/importers.

### ***Training needs***

- Modules on GAP and suitable handling practices both on and off farm.
- Training of trainers from whom the farmers will ultimately receive their training.
- Training collaterals in Bangla.
- Awareness building to check adulteration at all stages in the value chain.

### **Action points:**

The development of GAP for selected crops to be implemented through proper training of selected farmer groups with the help of strong extension support at pilot locations.

## **FOOD SAFETY AND RELATED IMPACT ON HEALTH**

### ***Technical session 1: Food safety related health issues in Bangladesh***

The types of food contamination, past experiences of food-borne disease outbreaks, and important challenges to prevent food-borne illnesses in Bangladesh were enumerated. References from topical news items that highlighted the adulteration and contamination in food helped the audience understand the extent and significance of the issue. High pesticide usage at the farm level, preservatives and ripening agents used during post harvest handling, contamination due to natural toxins and microorganisms that lead to food borne diseases and adverse health of the food handlers were discussed as potential risks. The need for surveillance of food borne diseases was emphasized illustrative examples of some recent outbreaks including *Nipah Encephalitis*, *Tetrodoxin*, *Xanthium strumarium*, and avian influenza in humans. Key challenges before Bangladesh such as regulation of food quality, adulteration, lack of farmer/handler/consumer awareness on the effects of microbial and chemical contamination, and lack of hygiene at the household level were highlighted.

## **Technical session 2: Monitoring food-borne pathogens in fruits and vegetables in the US**

Major challenges before Bangladesh to ensure food safety was listed, and it was emphasized that surveillance can play an important role in monitoring food safety in the country. The food safety system adopted in the US and their challenges were also described as a reference model. The active surveillance for food borne diseases and related epidemiological studies designed to help public health officials better understand the epidemiology of food borne diseases in the US was discussed in detail. As a case in point, surveillance networks working in the areas of fruits and vegetables and meat products in the US were also discussed.

### **Discussions:**

#### *Chemical usage*

- Use of toxic chemicals like formalin should not be used for food preservation, and only preservatives considered safe for foods (selected on science based evidence) should be used.
- Real time monitoring, surveillance, and capacity building is required.

#### *Food quality check*

- Hi tech laboratories are needed where a large number of samples could be tested using reliable sample testing mechanisms to check and ensure food quality. The quality of imported products should also be checked.

#### *Use of media during outbreak*

- It is important to partner with the media as most of the initial information on outbreaks and its reach comes initially from the media. Institute of Epidemiology, Disease Control & Research (IEDCR) engaged an organization for scanning all media reports on a day to day basis for tracing impending outbreaks. These issues are evaluated, investigated and validated to identify the potential cases and see that corrective measures are initiated.
- Educating media is also important to ensure that accurate and reliable information reaches the readers and viewers

#### *Control on virus transmission*

- IEDCR has a disease surveillance system in hospitals wherein a cluster of villages facing an outbreak of disease outbreak are identified and investigations are carried out within that cluster. A case control study is also conducted.

### **Action Points:**

Learning from global best practices and developing a framework for an efficient surveillance network in Bangladesh to map food borne disease prevalence to check outbreaks.

## **FOOD SAFETY POLICY ISSUES**

### **Technical session 1: Food Safety Policy in Bangladesh and the Role of Risk Analysis in Securing Food Safety**

Many recent news items that highlighted the food safety issues in Bangladesh and the reasons thereof were shown to the participants. Subsequently, the legislation governing the food industry was covered, touching upon the first East Pakistan Pure Foods Ordinance of 1959. The ministries monitoring various aspects of the value chain were also discussed. The immediate need for a national food safety policy; modern food laws and rules; structured and coordinated systems of food control management and oversight (involving inspectors, laboratories/analysts, trained food industry personnel) was emphasized. The importance of risk analysis involving risk assessment, risk management, and risk communication was flagged. In addition, an introduction to FAO's food safety project in Bangladesh, its key elements, and progress so far was also provided.

#### **Discussion:**

##### *Labs and their capacity*

- While some food safety laboratories run by the state and private organizations are available, these have a limited ability to test a range of samples and to handle large volumes. High tech labs with increased capacity are thus required.

##### *FAO project*

- The project focuses on developing the legislation, setting up of the lab, and training of inspectors as key elements.
- This initiative may turn into a top body in Bangladesh which will look after food safety standards and its implementation, and work directly under the government of Bangladesh with annual budget allocations.

#### **Action points:**

Policy level interventions could be left to bodies like FAO to attempt and HortCRSP should focus on GAP implementation and food safety.

## **FOCUSED GROUP DISCUSSIONS (with all participants)**

In the post lunch session of the workshop, all the participants were split into four thematic groups namely GAP, Surveillance, Risk Management and Mitigation, and Policy. Each group had 5 to 7 participants as group members, and was given one and a half hours to hold a group discussion and collectively develop theme specific action plans for the pilot project. At the end of the discussions, a representative of each team was asked to present the plan before the house. The following are salient features of the action plans suggested:

### GROUP-1 on Good Agricultural Practices (GAP)

- Development of good varieties, disease free planting material, strong distribution system, and a research program based on market driven problems.
- Improved practices for farm level production, handling, packaging, transportation, storage and processing.
- Human resource development (training on GAP).
- Microbial and chemical testing lab.
- Local certification and accreditation system harmonized with the GlobalGAP.

### GROUP-2 Surveillance

- Surveillance is required to check microbial and chemical contamination at
  - Production stage – seed, soil, irrigation water, fertilizers, and pesticides
  - Post harvest stage – physical verification and testing for microbes & pesticides
  - Handling and storage – environmental conditions including packaging materials, handling process, storage conditions
  - Transportation – means of transport, time and temperature during transportation, packaging material, handling
  - Distribution and retail – washing and handling
- Continuing training for trainers, farmers, food handlers, retailers, consumers
- Infrastructure development – laboratories for microbiology, soil testing, seed testing, pesticide testing, food safety surveillance

### GROUP-3 Risk Management and Mitigation

- Focused group discussions for planning with agriculture extension professionals, NGOs, farmers/growers, consumers, middlemen/collectors
- Define target for education and training
  - Chemical usage for farmers, food handlers, suppliers, extension workers
  - Hygiene and sanitation for farmers, handlers, consumers
  - Creating relationships with media for public education
  - Key agencies and NGOs for implementation and sustainability
  - Training of the trainers, monitoring and evaluation of such training, refined education tools/methods, and re-training needs.
- Creating incentives for behavioral adoption.

#### GROUP-4 Food Policy

- Framing a food policy which will cover production, handling, processing, marketing, and export of food products.
- Farmer friendly policies (FFP) for horticultural products.
- National centre for food safety of horticulture crops under Ministry of Agriculture (MoA) having regional centers (at North, South, East and the Centre) for capacity building and running laboratories for surveillance.
- Promote public private partnerships (PPPs).

Policy for training and re-training horticulturalists and agricultural extension agents in agriculture universities to address food safety.