Horticultural Chain Management: Managing Quality and Reducing Post-harvest Losses

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Economic and Social Development Department
Milestones in addressing post-harvest loss reduction

- **1970’s** - Dwindling funds
- **1980’s** - Technology push focus on grains
- **1990’s** - Systems approach
- **2000** - Attention to horticulture crops
- **2002** - Value chain approach
- **2008** - Milestones in addressing post-harvest loss reduction
- **2011** - Launch of SAVE-FOOD Multi-stakeholder platform
- **2012**
- **2015** - Sustainable Development Goals (SDGs) - 12.3.1

- **World Food Conference**
- **FAO Conference**

Launch of the action programme on food loss prevention
Global Initiative on Post-harvest
Launch of 2011 FAO report
SDG 12.3: By 2030, halve per capita global food waste at the retail and consumer levels and reduce food losses along production and supply chains, including post-harvest losses.
Definitions

- **Food loss** is the decrease in the quantity or quality of food resulting from decisions and actions by food suppliers in the chain, excluding retail, food service providers and consumers.

- **Food waste** is the decrease in the quantity or quality of food resulting from decisions and actions by retailers, food services and consumers.
Why Reduce Food Loss and Waste?

Improved food security and nutrition

Reduced natural resource use and GHG emissions

Improved productivity and economic growth

Source: SOFA 2019
Intervention location in the supply chain

**UPstream**
- Farm
  - Increase water quality and reduce water scarcity
  - Preserving land
  - Farmer income generation
  - Post-harvest loss reduction for increased food availability

**DOWNstream**
- Consumer
  - GNG emission reduction
  - Plastics reduction

**Objectives of loss and waste reduction measures and their entry points along the food supply chain**

- Increased quality and nutritional food content
- Food Re-distribution
- Reduced prices for consumers

*Source: SOFA 2019*
Partner:
University of Pretoria
S. Africa

Partner:
King Mongut’s University
Thailand
Horticultural Chain Management

The Past 2007.....

Objectives
❖ Manage Quality
❖ Assure Safety
❖ Reduce Loss

2016 and Onward

Objectives
❖ Manage Quality
❖ Assure Safety
❖ Reduce Loss

Innovation
To Enhance Efficiency and Sustainability

Toward Meeting the SDG 12.3 Target
Characteristics of Fruit and Vegetable Supply Chains in Asia

Modern Supply Chains

- Consumer/demand driven
- Logistics and cold chain systems
- Make use of post-harvest technology
- Highly efficient
  
    Good quality packaging

Traditional Supply Chains

- Production oriented
- Fragmented production units
- Multi-layered channels
- Limited use of post-harvest technology
- High level of inefficiency
- Absence of/Poor quality bulk packaging
Dimensions of FAO's Approach

Macro Level

Meso Level
Stakeholders

Micro Level

Sustainable Food System
• Organized groups of farmers and supply chain stakeholders

• Policy makers
  • Enabling environment

• Private sector
  • Engagement with governments through PPPs
  • As buyers of products/outputs
  • As technology suppliers

• Academia
  • Data collection through partnerships

Stakeholders in Meso-Level Actions

Farmers

Transporters
Meso-Level Actions to Manage Quality and Reduce Loss

- **Field level implementation to catalyse action**
  - Build an evidence base
    - Conduct surveys
  - Identify **Critical Loss Points** and underlying causes
    - Points where food losses have the highest magnitude, the greatest impact on food security, and the largest economic dimensions.
    - Inform measures to reduce both food loss and food waste
    - Are an important link to the FOOD LOSS INDEX
…Field level implementation to catalyse action

❖ **Identify innovations/innovative approaches** that enhance sustainability.
❖ Pilot innovations with stakeholders and analyse results.
❖ Development of context specific guidance materials
  ❖ technical
❖ Development of decision support material
  ❖ Cost/benefit and economic

Focus on actions and solutions that are economically, socially and environmentally friendly to address the specific sources of PHL
The Traditional Mango Supply Chain in the Philippines
Qualitative Loss Owing to Mechanical Damage and Latex stain
% MANGOES SHOWING COMPRESSION

Days in Retail

Mangoes in Retail – 5 Days

Stem-End Rot

Anthracnose

5 Days in Retail
<table>
<thead>
<tr>
<th>Supply Chain Level</th>
<th>Operation</th>
<th>Loss (%)</th>
<th>Cause/s of Loss</th>
<th>Recommended Interventions</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Farm</strong>&lt;br&gt;Harvesting</td>
<td>1.0</td>
<td>Fruit cracks</td>
<td>Early morning harvest and faulty harvesting</td>
<td>Delay harvesting when fruit is not turgid; supervise harvesting; additional harvesters especially for big volume of harvest</td>
</tr>
<tr>
<td>Packaging</td>
<td>0</td>
<td>Qualitative loss</td>
<td>Compression damage resulting in reduced price</td>
<td>Plastic crate as field and transport container</td>
</tr>
<tr>
<td><strong>Wholesale</strong>&lt;br&gt;Unloading and retail distribution</td>
<td>0</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Retail</strong>&lt;br&gt;Retail display; ripen with carbide</td>
<td>10.6</td>
<td>Decay (anthracnose, stem end rot, fruit rot)</td>
<td>Inappropriate preharvest disease management; rains during fruit growth and maturation</td>
<td>Hot water treatment after harvest</td>
</tr>
</tbody>
</table>
Impacts of Switching to Reusable Plastic Crates

Level of Severe Compression Damage (%)

Level of Moderate Compression Damage (%)

- Optimize quality and safety
- Minimise mechanical damage
- Improve economics
Impacts of Hot Water Treatment

Retail Level: Better Quality and Shelf-life and Reduced Levels of Loss

Stem End Rot

Anthracnose

5 Days in Retail

Improved Traditional
### Economic benefits of the interventions introduced (hot water treatment; plastic crates as packaging material).

<table>
<thead>
<tr>
<th>Supply Chain Level</th>
<th>Traditional</th>
<th>Improved</th>
<th>Benefits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Retail Level</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Net Returns (PhP/kg)</td>
<td>12.33</td>
<td>16.27</td>
<td>+3.94</td>
</tr>
<tr>
<td>Profitability</td>
<td>0.14</td>
<td>0.19</td>
<td>+0.05</td>
</tr>
</tbody>
</table>
Evidence-Based Sectoral Policy Briefs

POLICY MEASURES FOR MANAGING QUALITY AND REDUCING POST-HARVEST LOSSES IN FRESH PRODUCE SUPPLY CHAINS IN SOUTH ASIAN COUNTRIES

Smallholders and traders are key stakeholders in fruit and vegetable supply chains supplying local mass markets across South Asian countries. Training these stakeholders and introducing simple technical innovations into these supply chains can dramatically improve the quality and shelf-life of fruits produce and reduce losses, thereby generating economic benefits for producers, supply chain stakeholders and consumers as well as improving nutrition. Consequently, greater support is called for to address the challenges faced in traditional supply chains.

INTRODUCTION

Fruits and vegetables are rich sources of vitamins and micronutrients and contribute significantly to the nutritional quality of South Asian diets. High levels of post-harvest losses increase the cost of fresh fruits and vegetables for consumers and result in reduced income for smallholders handling fresh produce in the supply chain, particularly farmers who bear the cost of losses at the wholesale and retail levels because of low selling prices. Losses also represent a waste of land, labour, water, energy and fertilizer inputs that go into producing the fresh produce.

IMPORTANCE OF FOOD LOSS IN SOUTH ASIAN COUNTRIES

Food systems in South Asian countries are changing. Food patterns in South Asian countries are currently being transformed by a number of demographic and social factors. The population continues to increase across the subregion and urbanization is increasing. Food produced in rural areas must travel longer distances from farms to markets to supply the nutritional requirements of the growing urban population. Many small-scale traders and middlemen will shop at traditional wet markets for their fruits and vegetables. At the same time, the rapid growth of supermarkets has increased demand for fresh, high quality produce, which has opened up new market opportunities, and greater income for smallholders, who can adopt better practices and differentiate their fresh produce to target these markets, while still supplying traditional fresh markets.

Smallholders have scarce knowledge of post-harvest handling in the fresh fruit and vegetable supply chain. Smallholders are the main producers of fresh fruits and vegetables consumed in local markets across South Asia. Together with other stakeholders—traditional supply chains, farmers, traders, processors, wholesalers and retailers—they supply the food requirements of the region’s mass markets. Stakeholders in these traditional supply chains lack the basic knowledge of good post-harvest handling practices and the organizational capacities to address quality management.

<table>
<thead>
<tr>
<th>TABLE 1</th>
<th>Post-Harvest Losses for Fruits and Vegetables in South Asian Countries</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Country</strong></td>
<td><strong>% Loss</strong></td>
</tr>
<tr>
<td>India</td>
<td>29</td>
</tr>
<tr>
<td>Pakistan</td>
<td>30</td>
</tr>
<tr>
<td>Bangladesh</td>
<td>27</td>
</tr>
</tbody>
</table>

This book was supported under the FAO Technical Cooperation Project: TCO/18/12687 - Reduction of post-harvest losses in horticultural supply chains in SAARC countries.

POLICY RECOMMENDATIONS FOR IMPROVING QUALITY MANAGEMENT AND REDUCING POST-HARVEST LOSSES IN FRESH PRODUCE SUPPLY CHAINS

- **Strengthen human resource and institutional capacities to support post-harvest systems development**
  - Strengthen capacities of farmers and smallholders in the supply chain and develop capacities within extension systems to address quality management, safety assurance and loss reduction in fruit and vegetable supply chains.
  - Strengthen educational and research institutions to include extension approaches within their post-harvest curricula.
  - Support training and capacity development for fruit and vegetable small and medium sized enterprises (SMEs) that engage in the fabrication of post-harvest technologies for local markets.
  - Support the organization of smallholders for capacity development and better access to improved technologies and practices.
  - Promote and facilitate the establishment of national and regional networks for information and technology exchange on post-harvest systems development.

- **Provide an enabling environment to support post-harvest systems development**
  - To view the importance of fruits and vegetables and their supply chains to nutrition, public goods should be provided—electricity, water, transport systems, communication technology and standards—to support the development of post-harvest systems in fruit and vegetable supply chains.
  - Smallholder organizations and supply chain stakeholders should be assisted with accessing finance, for example through credit channels that have been designed to support the acquisition of post-harvest technologies such as plastic crates for bulk packaging, harvesting tools, hot water treatment tanks to eliminate pests and diseases.
  - Campaigns could be supported and implemented that would promote the economic, social (including nutritional) and environmental benefits of reducing post-harvest losses in fruit and vegetable supply chains.

SAVE FOOD Global Initiative on Food Loss and Waste Reduction Food and Agriculture Organization of the United Nations (FAO) Viale delle Terme di Caracalla 00153 Rome, ITALY Contact: Ross Rolfe, FAO (Ross.Rolfe@fao.org) www.fao.org/save-food SaveFoodFacts.org

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❖ Public Goods

- Case Studies
- Technical guidance documents
- Decision support materials
- Survey reports
- Guidelines
Knowledge Sharing Platforms

**Community of Practice on Food Loss and Waste**  

**FAO/IFPRI/G20 Technical Platform on Food Loss and Waste**  

**Innovation Platform on Post-harvest Operations (INPhO)**

The **Community of Practice (CoP) on food loss reduction** serves as a global convener and an integrator of knowledge related to post-harvest loss (PHL) reduction.

It offers a platform to facilitate linkages and information sharing amongst stakeholders and relevant networks, projects and programs.

To join the CoP register online at:  
www.fao.org/food-loss-reduction
Training of Trainers - Theoretical training, site visits, practical exercises, hands-on activities in pilots

Regional

National – Classroom

Field Level
This work was supported through a Letter of Agreement with the University of the Philippines Los Banos in the framework of a Partnership.
Join us in observing the

FIRST INTERNATIONAL DAY OF AWARENESS OF FOOD LOSS AND WASTE

29 September, 2020