



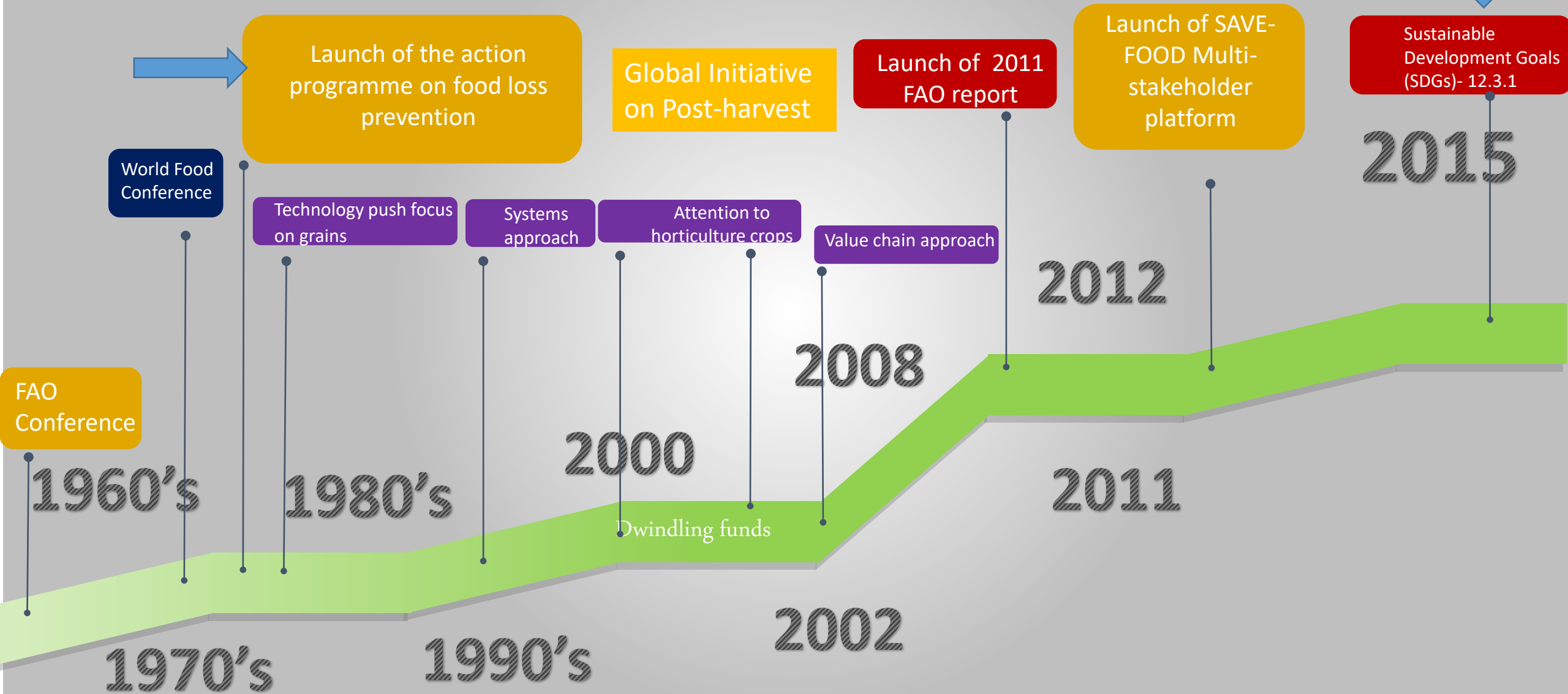
Food and Agriculture
Organization of the
United Nations

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

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Economic and Social*



Milestones in addressing post-harvest loss reduction



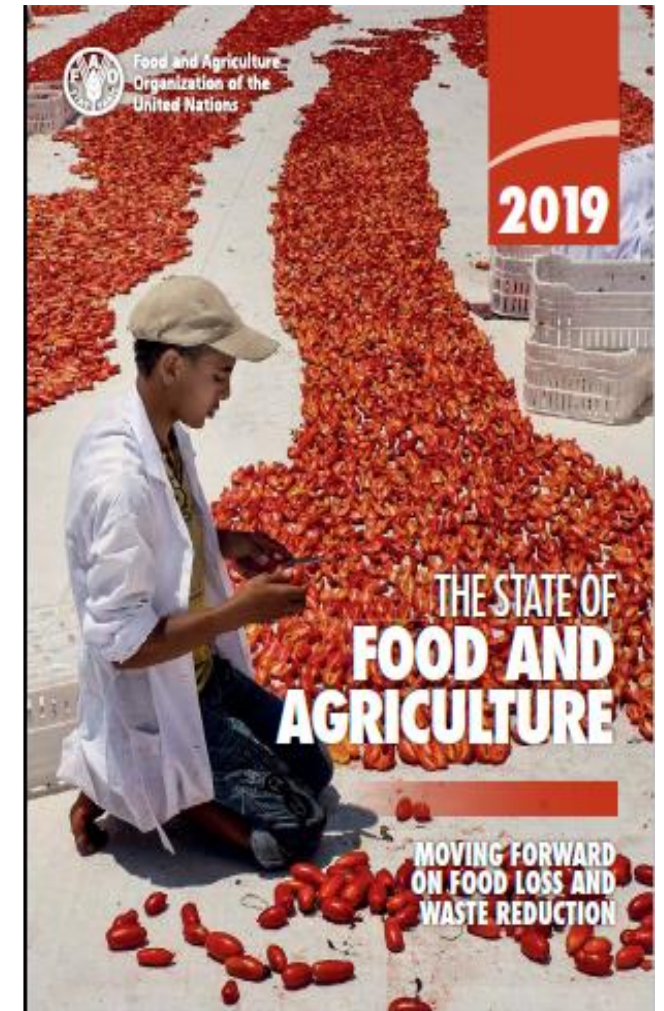
12 RESPONSIBLE
CONSUMPTION
AND PRODUCTION



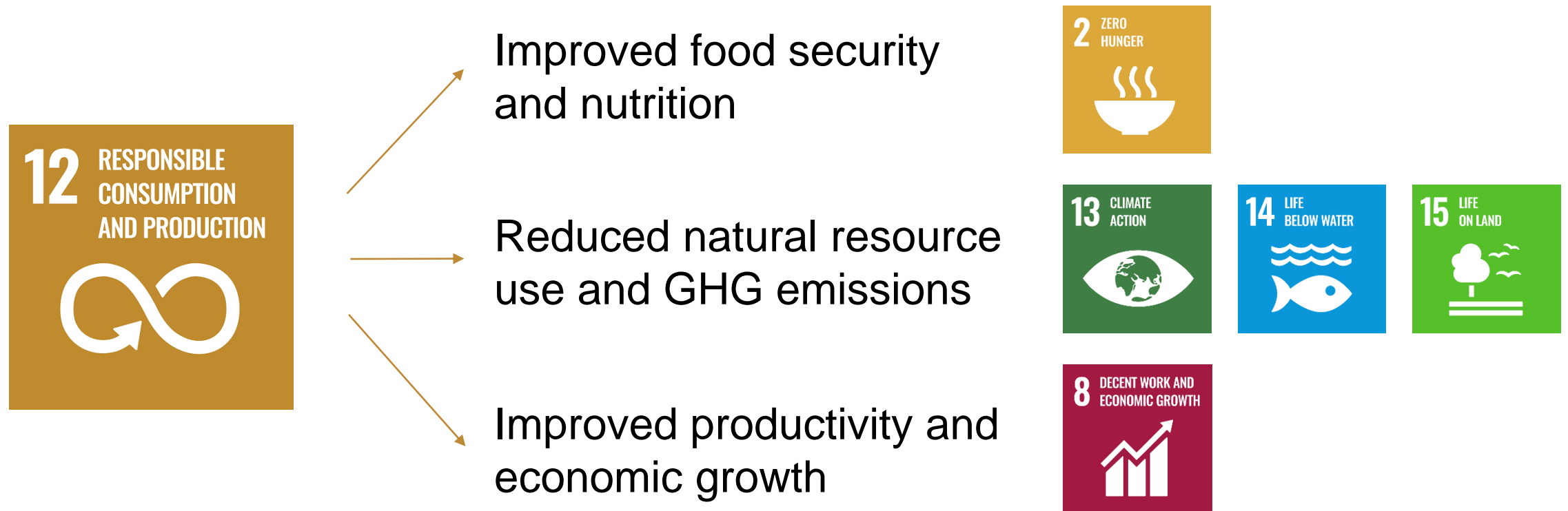
SDG 12.3: By 2030, halve per capita global food waste at the retail and consumer levels and reduce food losses along production and supply chains, including post-harvest losses.

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?



Intervention location in the supply chain



Increase water
quality and
reduce water
scarcity

Preserving land

Farmer income
generation

Post-harvest loss reduction for increased food
availability

GNG
emission
reduction

Plastics reduction

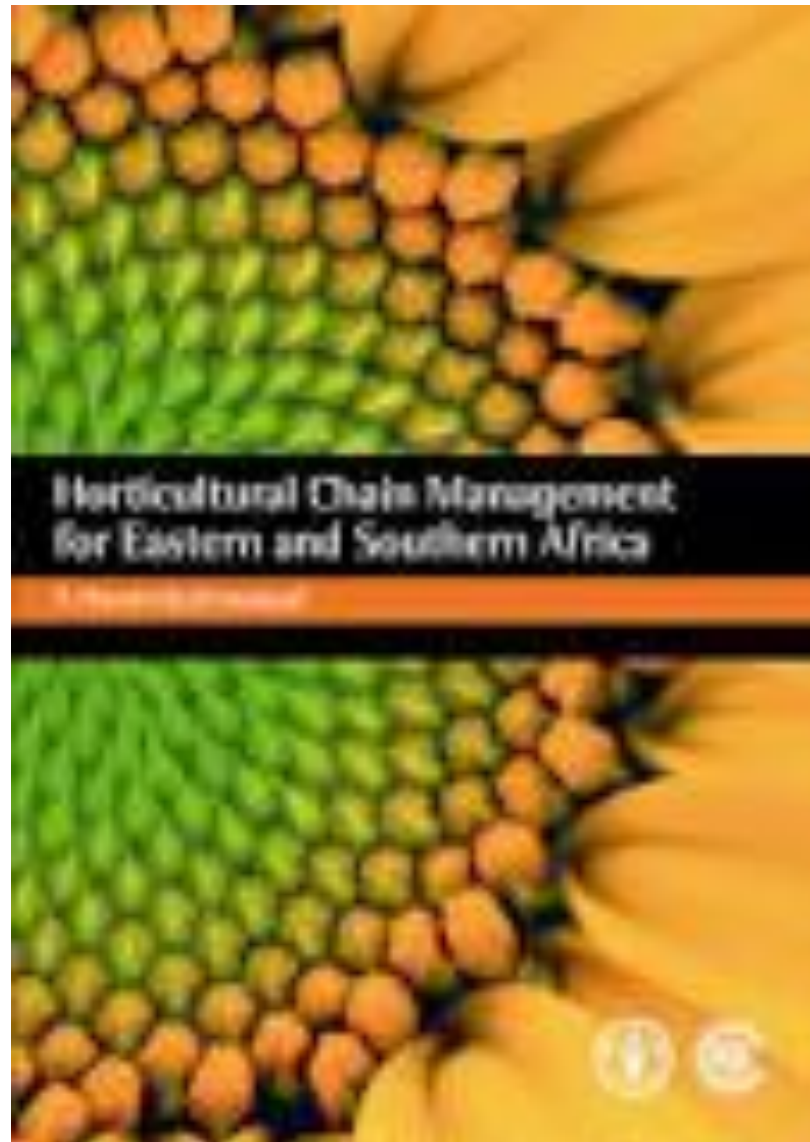
Increased quality and
nutritional food content

Food
Re-distribution

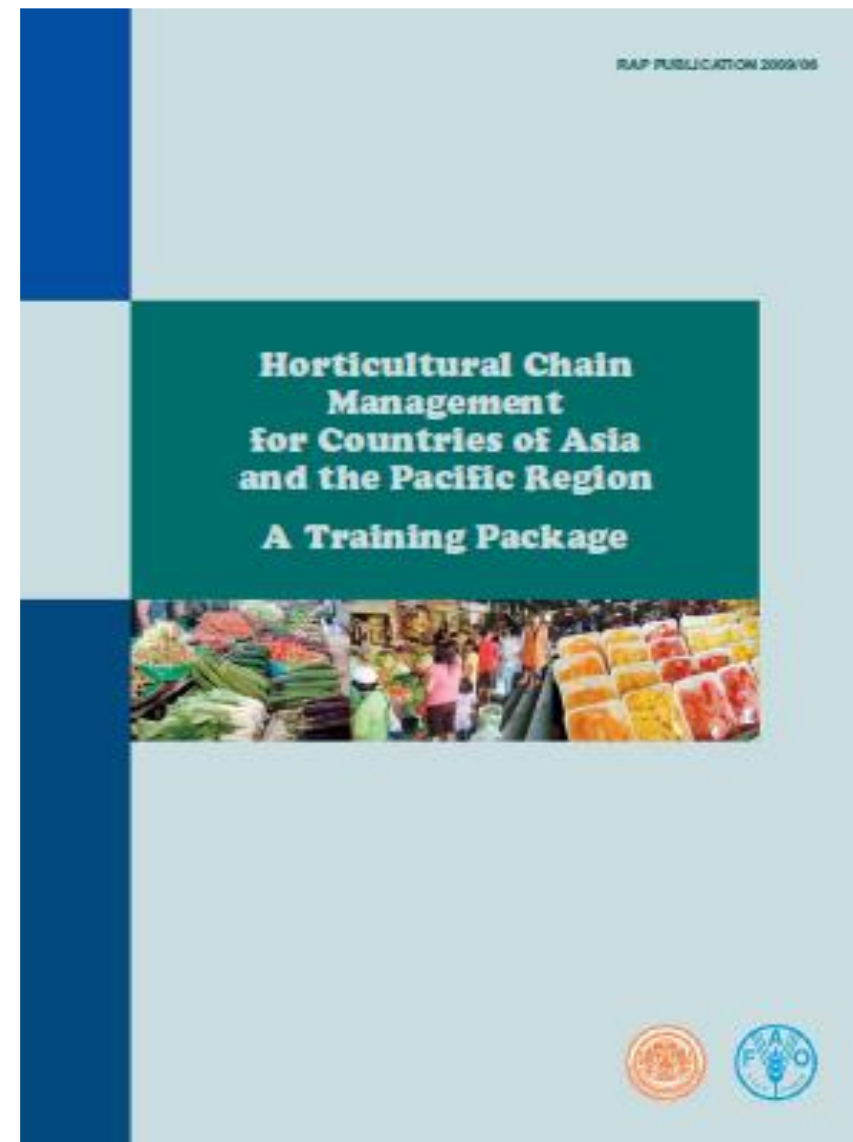
Reduced prices
for consumers

- Environmental sustainability objectives
- Food security and nutrition objectives

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



Partner
University
of Pretoria
S. Africa



Partner:
King Mongkut's
University
Thailand

Horticultural Chain Management-----Toward Meeting the SDG 12.3 Target

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

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



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Dimensions of

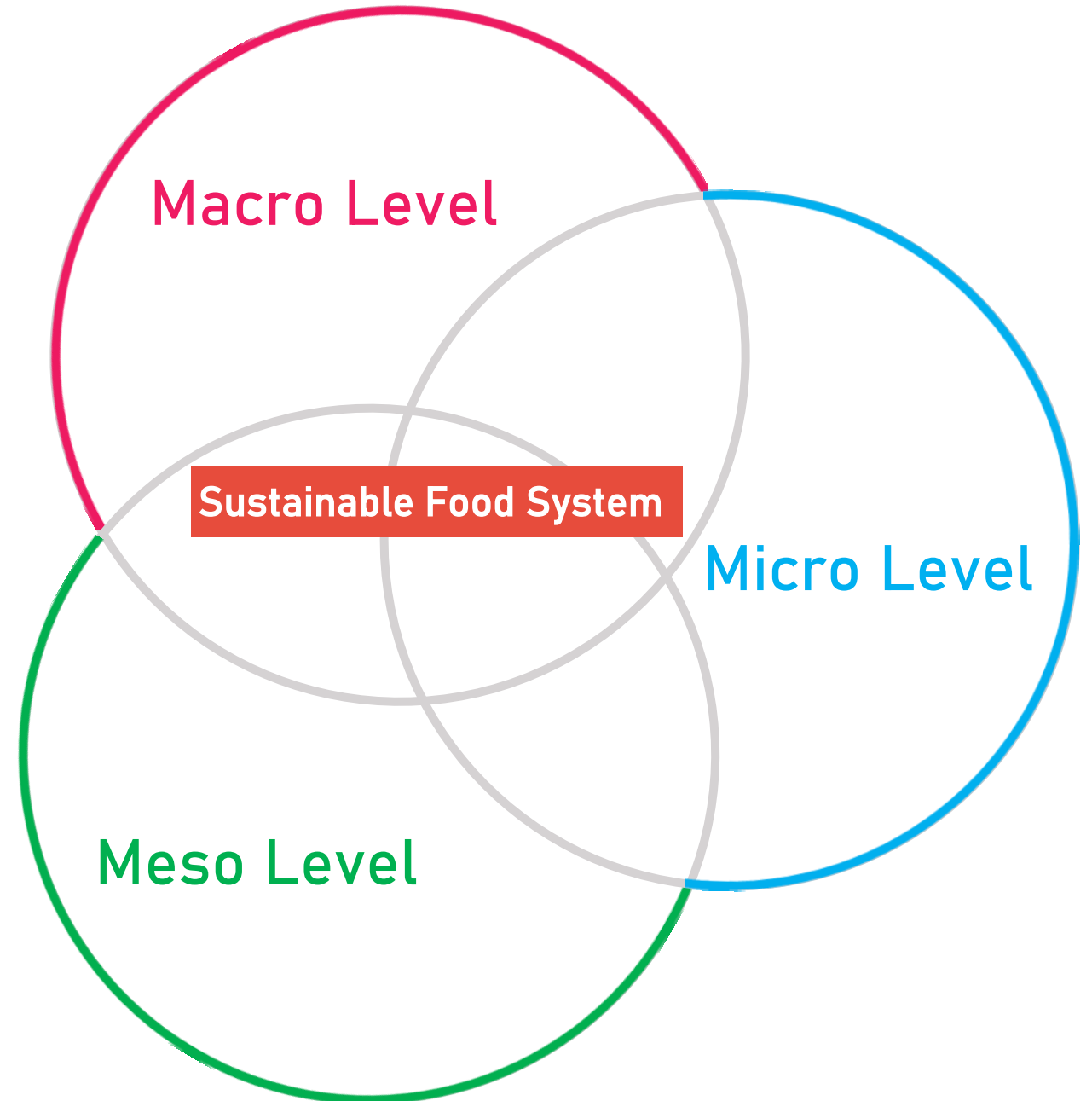
FAO's Approach

Macro Level

Meso Level

Stakeholders

Micro Level



- **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



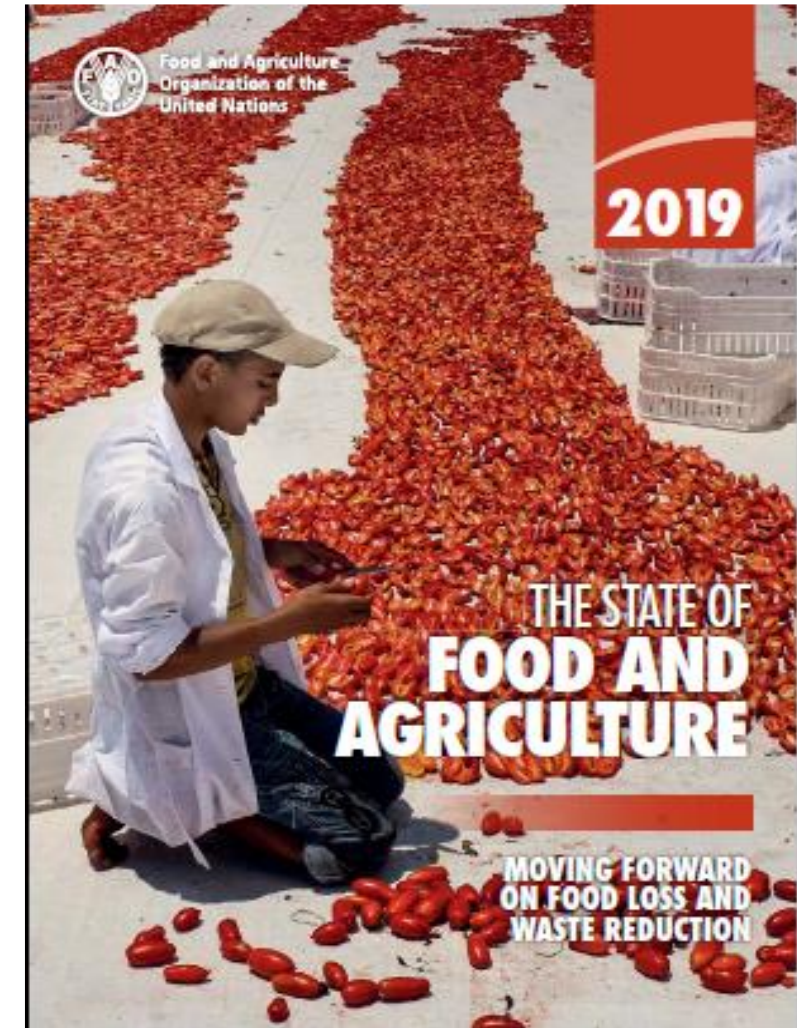
Farmers



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





Meso-Level Actions to Manage Quality and Reduce Loss

- ▶ **...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

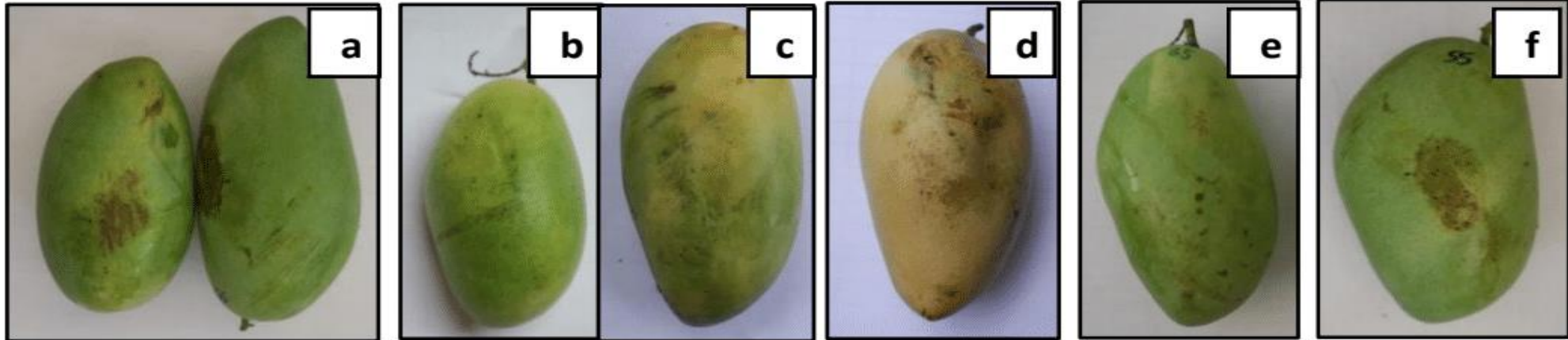
Focus on actions and solutions that are economically, socially and environmentally friendly to address the specific sources of PHL

The Traditional Mango Supply Chain in the Philippines

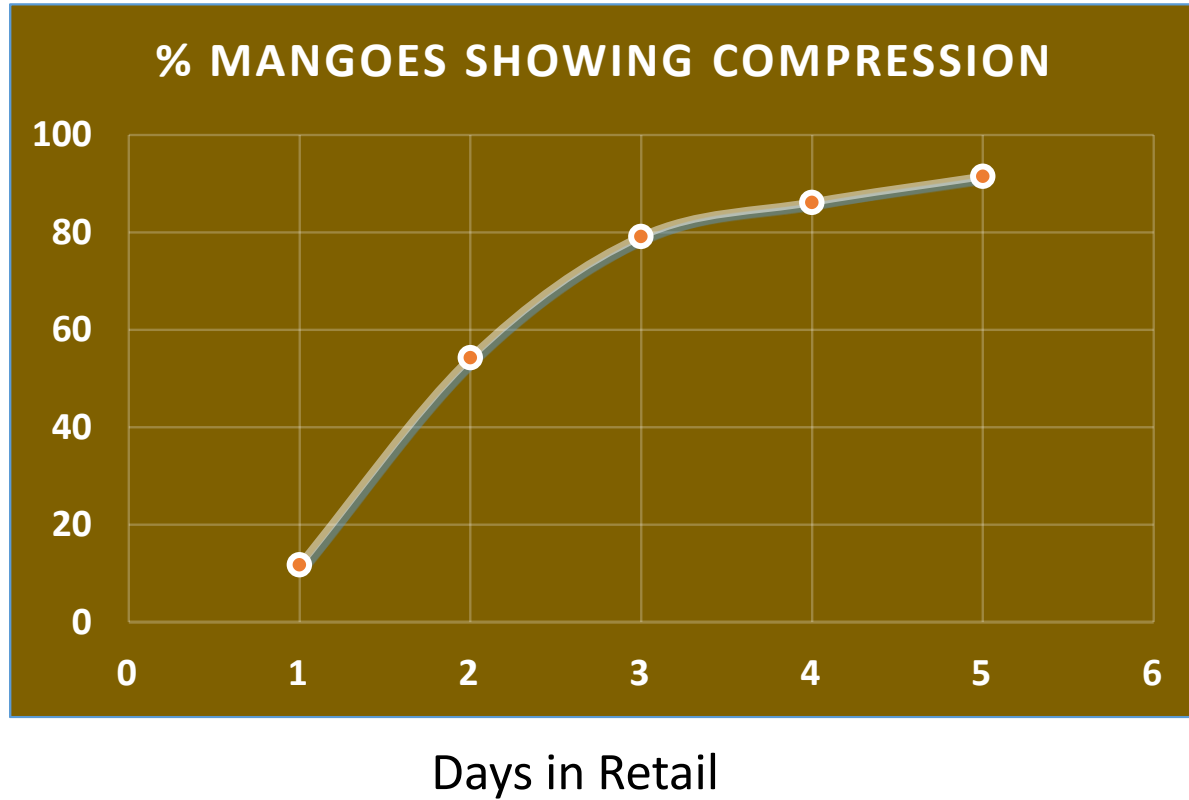


Mangoes Arriving at the Wholesale Market

Qualitative Loss Owing to Mechanical Damage and Latex stain



Mangoes in Retail – 5 Days



Stem-End Rot



Anthracnose

5 Days in Retail

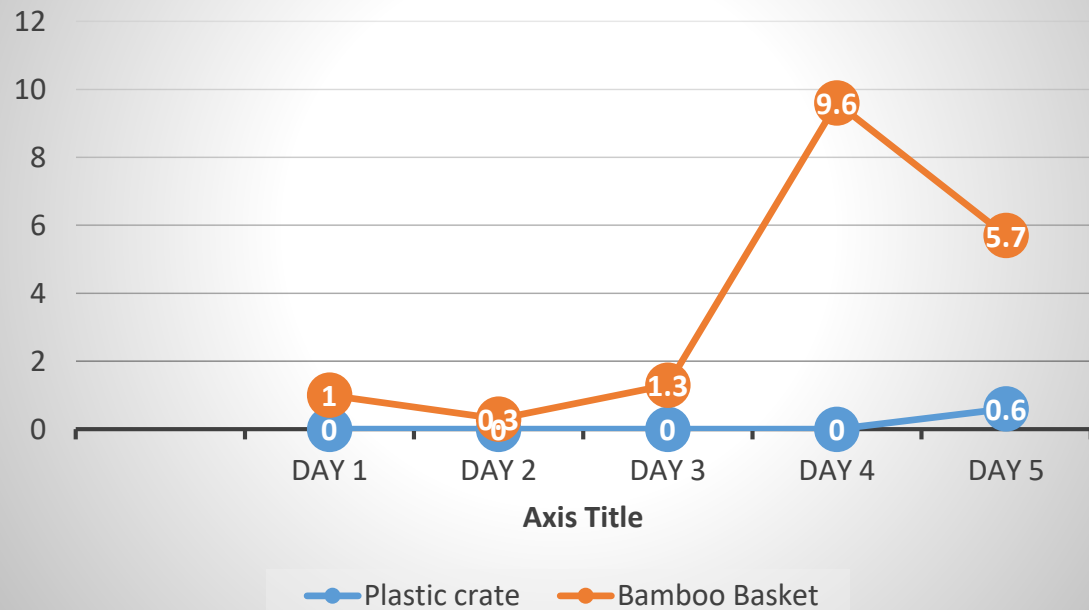


Extent and nature of losses in mango, cause/s of loss and recommendations to reduce losses

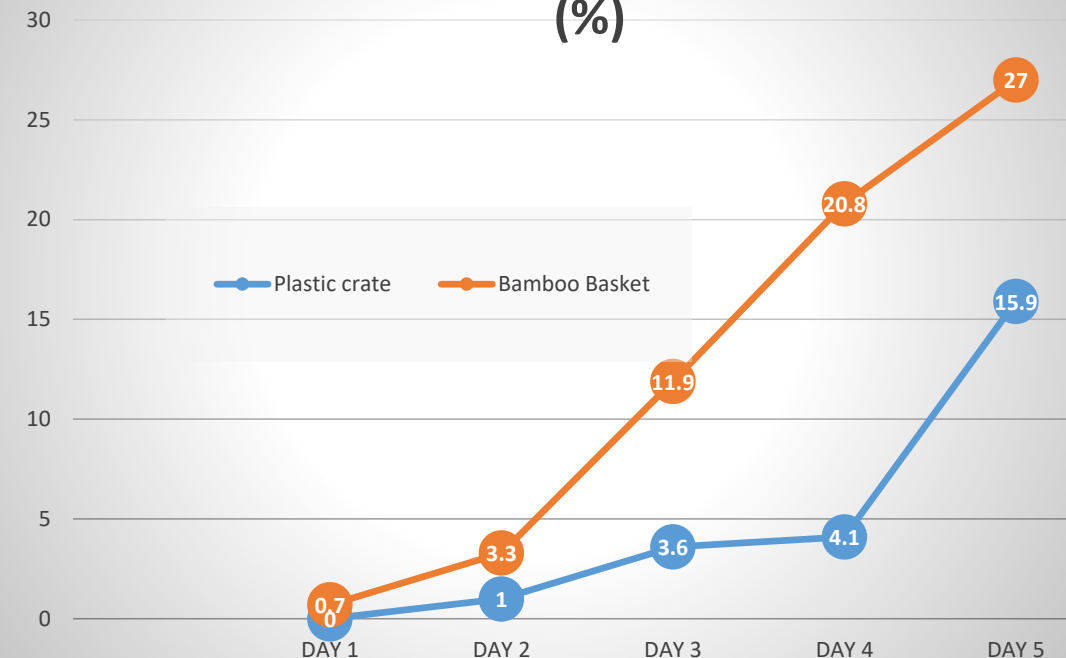
Supply Chain Level	Operation	Loss (%) ¹		Cause/s of Loss	Recommended Interventions	LOSSES
		Extent	Nature			
Farm	Harvesting	1.0	Fruit cracks	Early morning harvest and faulty harvesting	Delay harvesting when fruit is not turgid; supervise harvesting; additional harvesters especially for big volume of harvest	
	Packaging	0 Qualitative loss	Compression damage resulting in reduced price	Packing in semi-rigid bamboo basket with Kraft paper as liner	Plastic crate as field and transport container	
Wholesale	Unloading and retail distribution	0				
Retail	Retail display; ripen with carbide	10.6	Decay (anthracnose, stem end rot, fruit rot)	Inappropriate preharvest disease management; rains during fruit growth and maturation	Hot water treatment after harvest	WASTE

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

**5 Days
in Retail**



**Stem End
Rot**



Anthracnose



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

Supply Chain Level	Traditional	Improved	Benefits
Retail Level			
Net Returns (PhP/kg)	12.33	16.27	+3.94
Profitability	0.14	0.19	+0.05



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 fresh 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 fruits and vegetables for consumers and result in reduced income for stakeholders handling fresh produce in the supply chain, particularly farmers who bear the cost of losses at the wholesale and retail levels because of low farmgate prices. Losses also represent a waste of land, labour, water, energy and the 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 systems 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 farm to markets to supply the nutritional requirements of the growing urban population; many still shop at traditional wet markets for their fruits and vegetables. At the same time, the rapid growth of supermarkets has caused a growing demand for safe, 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. The economic and nutritional importance of traditional fruit and vegetable supply chains, therefore, warrants governments' specific focus to address deficiencies related to post-harvest systems in these supply chains.

Stakeholders 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 in traditional supply chains – harvesters, traders, transporters, 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 1
Post-harvest losses for fruits and vegetables in South Asian countries

Crop	Losses (%)
Banana	29
Cauliflower	52
Mandarin	20
Mango	38
Snap beans	52
Winter tomato	46

Source: Field data.

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 stakeholders 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 local 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
 - In view of 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 when accessing finance, for example through credit schemes 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.

This work was supported under the FAO Technical Cooperation Project: TCP/RAS/3502 – Reduction of post-harvest losses in horticultural supply chains in SAARC countries.

PHOTO 4
Hot water treatment of mangoes



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

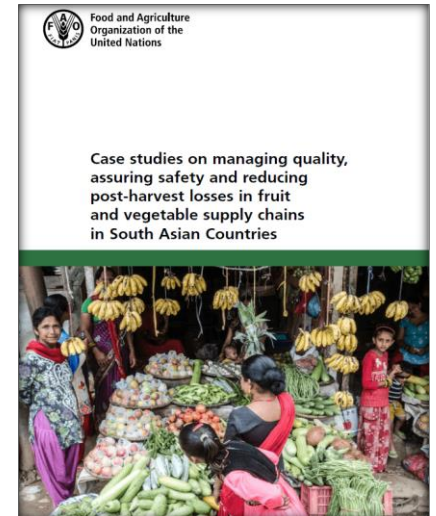
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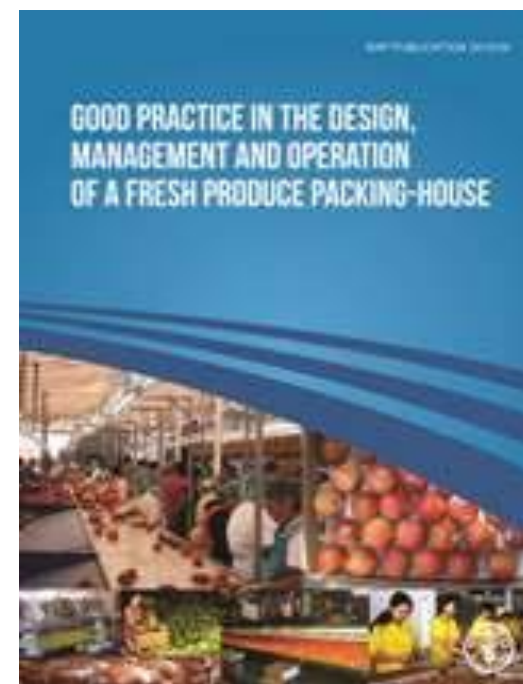
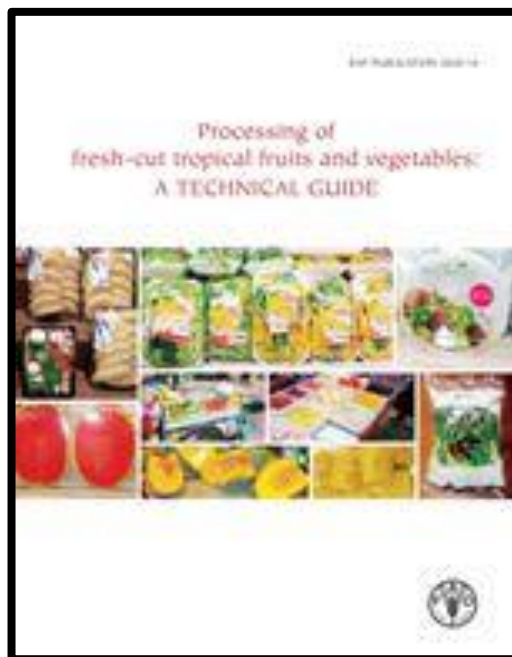
www.fao.org/save-food
Save-Food@fao.org



❖ Public Goods

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







Knowledge Sharing Platforms

Community of Practice on Food Loss and Waste

<http://www.fao.org/food-loss-reduction/en/>

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

<http://www.fao.org/food-loss-reduction/en/>

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



National – Classroom



Regional



Field Level



Acknowledgement

**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



Food and Agriculture Organization
of the United Nations