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

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- General context and rationale
- Methodology
- Identification of critical loss points
- Identification of solutions
- Piloting of solutions in modern and traditional chains
- Conclusion



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**Horticultural Chain
Management
for Countries of Asia
and the Pacific Region
A Training Package**



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

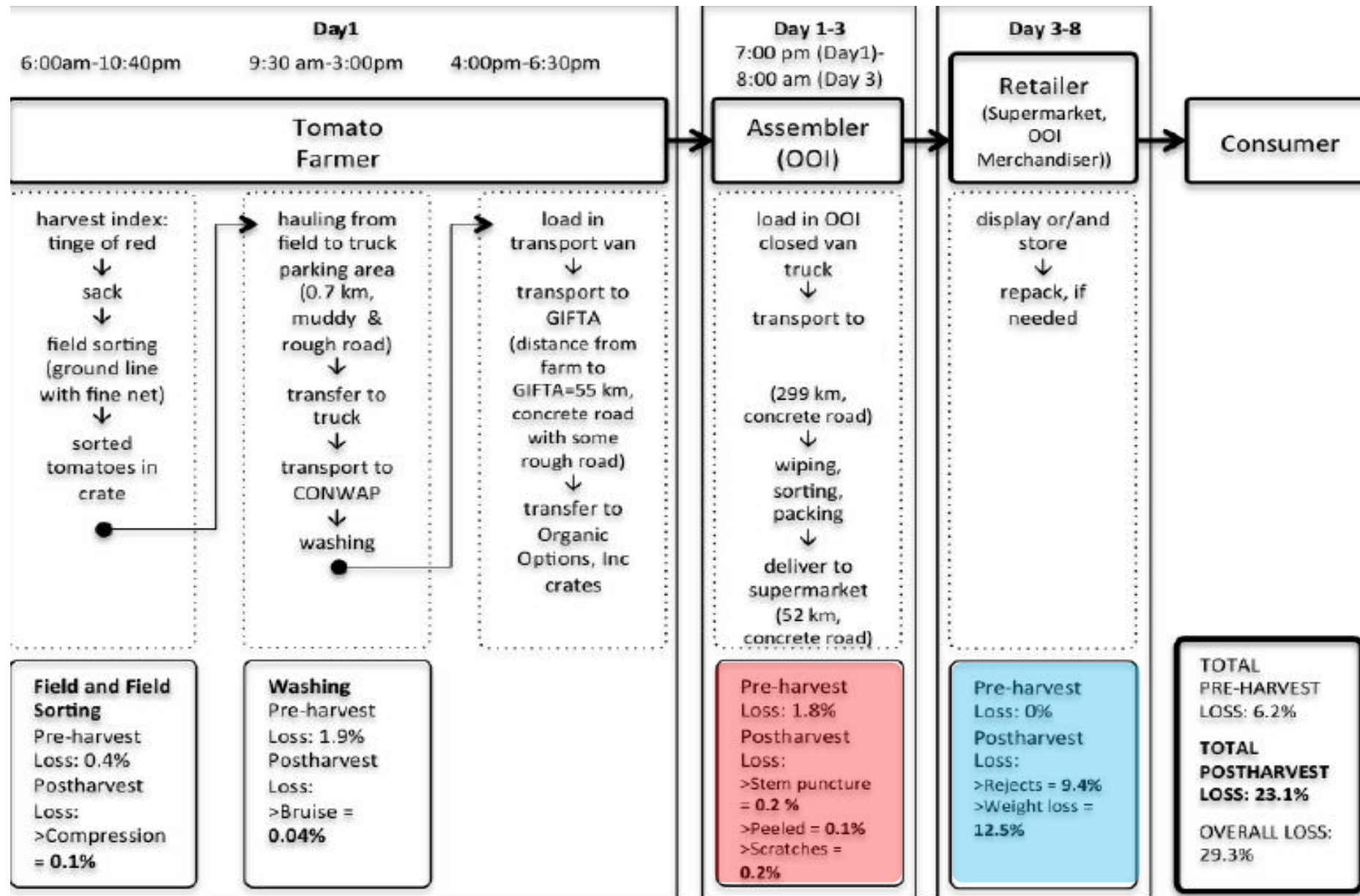


Methodology

- ▶ **Stakeholder sensitization** and KAP surveys
- ▶ **Market** surveys
- ▶ **Training** of trainers
- ▶ **Mapping the supply chain and identification of critical loss points**
- ▶ **Pilot demonstration** of good practice, measurement and assessment
- ▶ Documentation and **analysis of results**
- ▶ **Training of stakeholders**
- ▶ **Dissemination of results**
- ▶ **Policy** recommendations for Governments



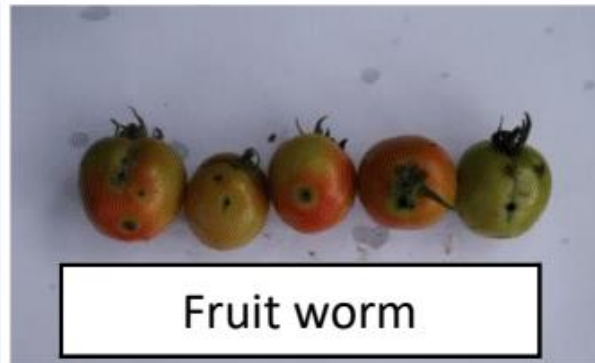
Mapping a Modern Organic Value Chain to Identify Critical Loss Points



Loss Analysis and Identification of Solutions

Supply Chain Level	Operation	Loss (%)		Cause/s of Loss	Recommended Interventions
		Extent	Nature		
Farm	Harvesting	0.04	Preharvest (insect damage, blossom end rot, undersize)	Inadequate pest and nutrient management	Integrated crop management following the recommendations of the company
		0.10	Compression	Plastic sack as harvesting container	Use of plastic pail as harvesting container
	Washing, sorting, and packing in plastic crate	0.04	Bruising	[Damage during harvesting and field sorting]	Addition of disinfectant to the wash water to control decay at retail level
GIFTA collection center	Sorting; Transfer to Company plastic crate	0.44	Mechanical damage	[Damage during harvesting and field sorting, and repeated handling]	Exchange of plastic crates between to reduce handling steps and occurrence of damage
Organic Options packinghouse	Sorting and retail packing	0.5	Stem puncture, skin tearing, scratches on peel	Multiple handling from the farm to packinghouse	Reduce multiple handling
Retail	Display	6.8	Decay, mechanical damage	Multiple handling; use of plain wash water	Reduced multiple handling; addition of disinfectant during field washing

Causes of Rejection of Organic Produce















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Sampling of tomatoes



Sampling: 10% by weight
or count

Assessment: Daily

Operation	Traditional Practice	Improved Practice
(1) Harvesting Time: 8:50 - 11:45 am (August 14, 2018) > harvested when tinge of red is seen in tomato > Traditional: 8-10 mins to fill plastic sack (~ 7kg) > Improved: 8-10 mins to fill 2 pcs. plastic pail (5kg/pail)		
(2) Transfer to crates Time: 9:00 am - 11:45 pm (August 14, 2018) > 20-22 kg tomato per crate > Traditional: 1 crate = 3 sack of tomatoes (3 picking cycle) > Improved: 1 crate = 4 pails of tomatoes (2 picking cycle)		
(3) Transfer to sorting area via wooden cart Start: 11:45 am - 12:18 pm (August 14, 2018) > steep, muddy road > 12 crates capacity (23 kg per crate) > covered with tarpaulin to prevent tomatoes from spilling out > 10 minutes travel time		
(4) Sorting of tomatoes at field Start: 1:50 pm - 2:55 pm (August 14, 2018) > Traditional: 5 persons sorting 5 crates on tarpaulin (20 mins) > Improved: 1 person sorting 2 crates on walled matting with cushion (20 mins)		
(5) Hauling of GIFTA Start: 3:10- 5:00 pm (August 14, 2018) > 40 mins from field to on road with about 50% cemented and 50% under construction > stopover at office > 1 hour from CL... .. GIFTA on cemented road		

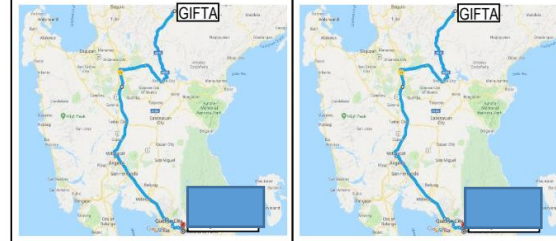
(6) Turnover of tomatoes between

Start: 5:00- 6:00 pm (August 14, 2018)
 > Tomatoes unloaded from open truck
 > Traditional - transferred to different crate
 > Improved - no change in container or crate
 > Tomatoes loaded to 6-wheeler closed



(7) Shipment

Start: 6:00 pm (August 14, 2018) to 2:00 am (August 15, 2018)
 > Actual distance travelled - 323 km
 > non-refrigerated
 > cemented road condition
 > van doors opened upon arrival at Organic Options, Inc.



(8) Unloading of crates to packinghouse

Start: 8:30 am - 8:40 am (August 15, 2018)
 > Crates placed in packinghouse at room temperature (28 °C)
 > natural ventilation in packinghouse



(9) Packing of tomatoes

Start: 3:00 pm - 8:10 pm (August 15, 2018)
 > clear polypropylene (PP) bags with 4 x 0.5 cm² hole area
 > 2 packers per crate



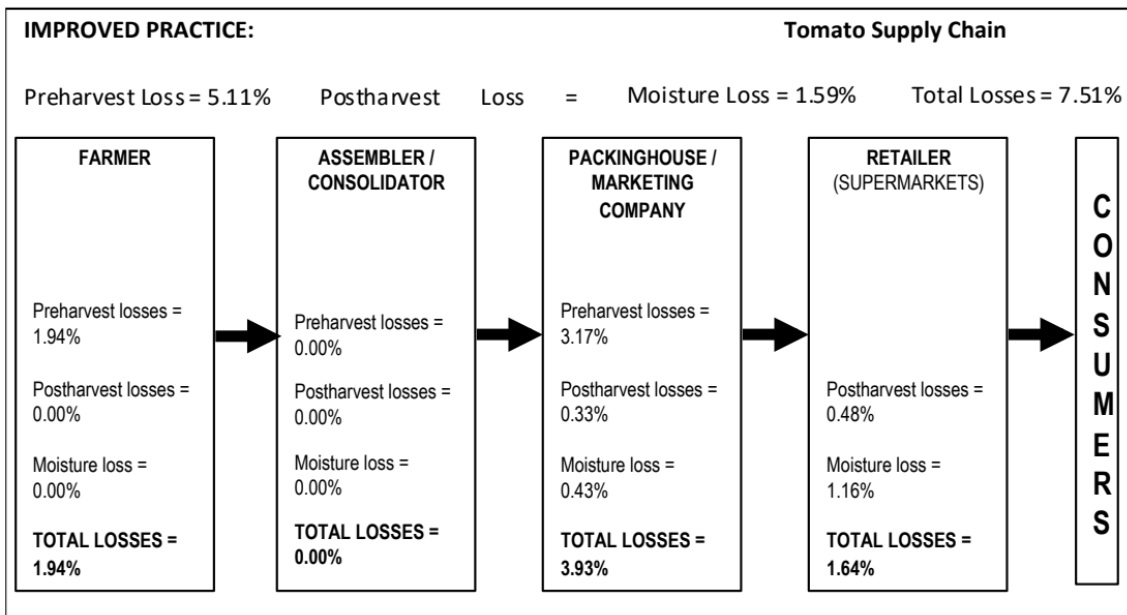
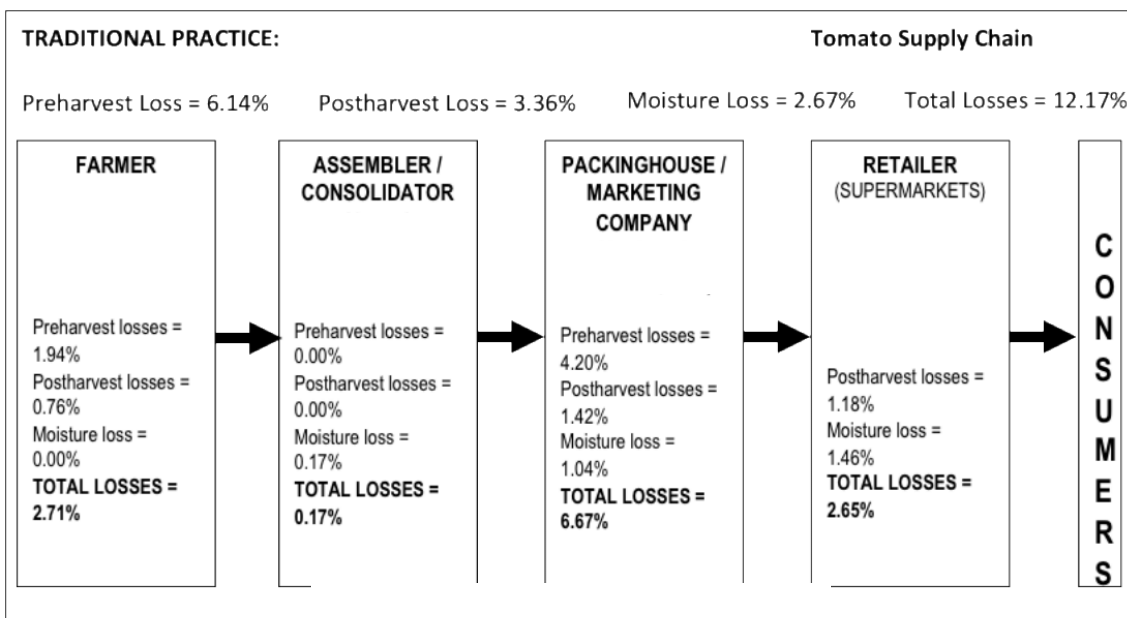
(10) Delivery and retail display in supermarket simulation

Start: August 16 - 21, 2018 (Day 0 to 5)
 > Tomatoes transported to PHTRC for supermarket simulation
 > Room temperature = 18-20 °C
 > Daily monitoring of weight loss and quality rejects
 > Unmarketable rejects removed and



Consider time
Level of handling
Resource efficiency

Supply Chain Map and Losses Incurred at Each Step in the Chain





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The traditional winter tomato supply chain in Bangladesh

Field level activities

- ▶ Harvesting
- ▶ Packaging in mesh sacks





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Improvements introduced in the tomato supply chain



Improved post-harvest
handling and packaging



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Causes of loss during transportation



Moderate compression



Severe compression

Qualitative

Loss



Cracks (non-marketable)



Decay, cracks (non-marketable)

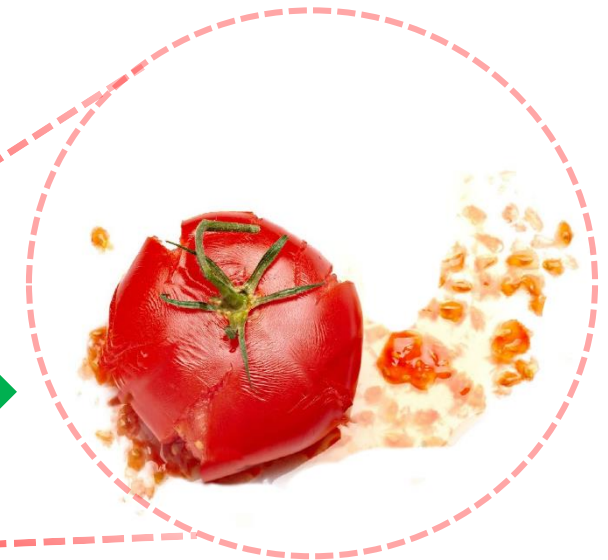
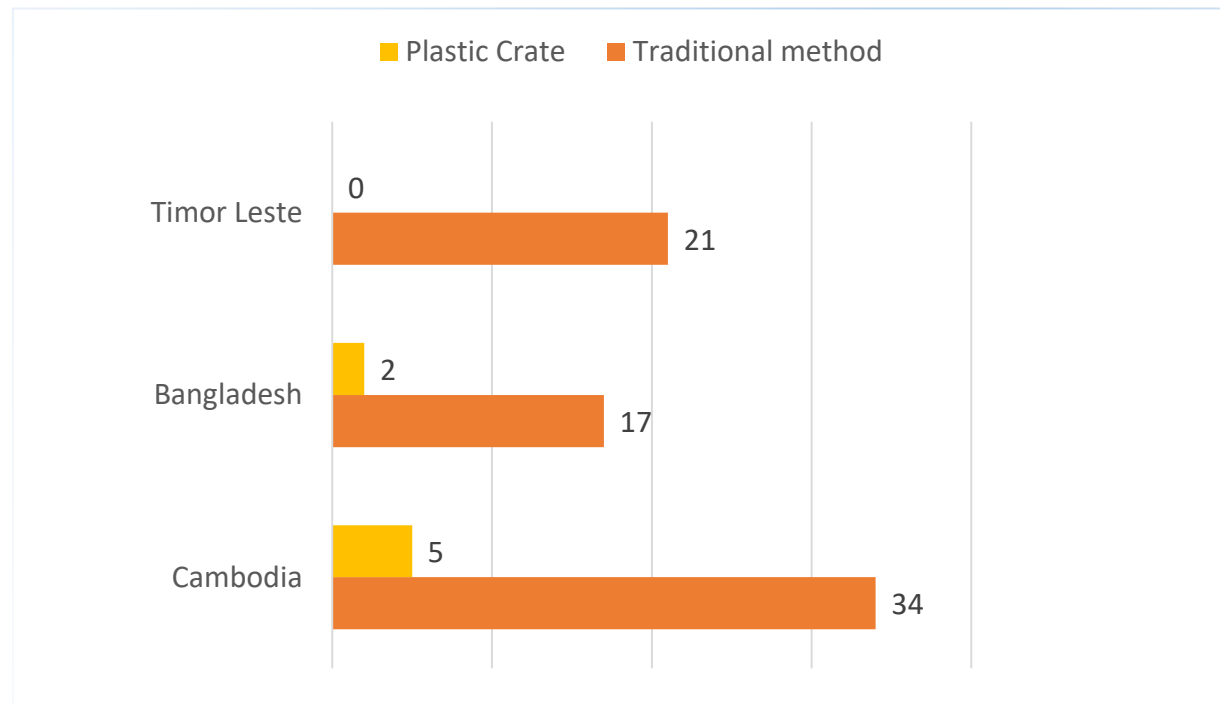
Quantitative

Recovery of sound fruit at the wholesale level



Top 97.8%	Top 66.7%
Middle 96.7%	Middle 61.1%
Bottom 90.0%	Bottom 30.0%





Traditional Method

- In better organized systems, the levels of losses are low.
- Simple and appropriate solutions can greatly impact loss reduction
- How can this be scaled up?
- What is needed?



Thank You