Innovative Small-scale Postharvest Technologies for reducing losses in Horticultural Crops

Dr. Lisa Kitinoja
The Postharvest Education Foundation
Oregon, USA
www.postharvest.org
INTRODUCTION – Postharvest losses for hort crops

Very high levels of postharvest losses (20% to 50%) are experienced in developing countries.

PEF has identified a variety of cost effective practices for helping smallholder farmers and produce marketers to reduce postharvest losses and to improve incomes.
Which postharvest technologies were most successful and why?

Simple, easy to try, small scale postharvest practices.

- fit well into an existing value chain and marketing system
- encouraged farmers to take more responsibility for their crops after harvest
- were profitable in the local setting
- developed new or improved market links
- built local capacity (ie: included training of extension workers)
Large scale efforts to provide packinghouses or complex postharvest infrastructure such as cold storage facilities.

Three reasons for failures reported:
- problems with selection of sites (poor location for growers, making access difficult)
- high costs for the energy required for operations (electricity, fossil fuels)
- the lack of trained local personnel needed for successful long-term management
Key constraints include:

- Lack of availability of basic postharvest equipment, tools and supplies in rural areas
- Lack of local knowledge and technical capacity (few local postharvest trainers exist)
- Lack of small farmer access to any existing postharvest information, supplies, market information, credit
Key constraints include (continued):

- Lack of trustworthiness of existing postharvest information
- Lack of financial incentives for farmers to use improved handling practices (often due to the role of intermediaries)
- Limited market access for smallholders (who often lack information on market prices, or any means of transport to markets)
POSTHARVEST LOSSES

- Measured losses ranged from moderately high (20 to 30%) to extremely high (60 to 80%)
- Losses are due to physical damage, decay, wilting, quality deterioration
- Market value losses (mean = 30%)

The 5 Major causes/sources of losses =
- Temperature abuse
- Poor quality packages
- Poor field sanitation
- Delays between harvest and final sale
- Mismatch of crop volumes with market demand
High temperatures

Temperature after harvest

Student recording pulp temperature in wholesale market
Poor quality packages

Packed in Cloth bundle

Enormous sacks of cabbage (Ghana)

Leafy greens in bundles (Benin) undergo heavy damage during packing and transport
Recommended Postharvest Technologies

8 major categories of appropriate postharvest technology interventions:

- reduce losses
- cost effective
- appropriate scale for small farmers
- easy to use on a trial basis
- capable of generating increased incomes from horticultural crops by at least 30% for small farmers.
The 8 categories of Appropriate Postharvest Technologies

- Improved containers
- Use of shade
- Field packing systems
- Low energy cool storage: zero energy cool chambers (ZECC)
- CoolBot™ equipped small cold rooms
- Field curing of root and tuber crops
- Improved solar drying methods
- Low cost food processing practices
Use of shade
Improved containers
Field packing
Zero energy cool chambers
CoolBot™ equipped cold room
Village scale processing
CONCLUSIONS

- The use of these simple technologies either alone or in combination helped farmers to reduce postharvest losses for all the horticultural crops we have studied.
- The general principles that are being achieved by their use will work well for protecting all horticultural crops from high losses.
General Recommendations

- Avoid building expensive, complex postharvest infrastructure that is difficult for smallholders to utilize and manage.

- Instead: **Promote the development of an integrated postharvest management system for small farmers and marketers**.
Integrated postharvest management systems

Include training of farmers by locally based postharvest specialists on:

1) improving quality on the farm (using proper maturity indices, gentle handling, pre-sorting, protective packages, and shade)

2) utilizing when appropriate, some form of inexpensive cooling, storage or processing in order to reduce food losses and enhance market value

3) taking more responsibility for postharvest handling, processing and marketing.
PEF’s concept for developing countries that pulls all these recommendations together

A PTSC provides a comprehensive package of training, demonstrations, postharvest goods, services and advice

Targets the bottlenecks and missing components of the value chains

Can be modified to fit local needs
Postharvest Training and Services Center (PTSC)

5 PTSCs are currently in operation:

2 sites in Arusha, Tanzania: USAID HORT CRSP project in East Africa, with UC Davis, WFLO, UGA and AVRDC

3 sites in Rwanda: USAID Hort Innov Lab project with ABA Inc, Univ of Rwanda, NAEB and RAB

Similar postharvest training centers are in development by TAHA and MIVARF in Tanzania, Jimma Univ/Ethiopia, CNFA/Liberia, ABA/Burkina Faso, AVRDC/Bangladesh, KALRO/Kenya, Udayana Univ/Bali, Indonesia
Model Postharvest Training and Services Center (PTSC)

- Security Fencing
- Electric Power IN
- Shade Structure
- Insulated Cold Room 3 x 4 m
- Locker 2 x 3 m
- Counter
- Outdoor Storage Shed 4 m x 10 m
- shelves
- Cement Floor 10 m x 20 m
- Water Pump
- Work Tables
- Water tank
- ZECC
- Solar Dryers
- Large Entry Door
- Graveled Area around Site

Sketch by L. Kitinoja; Digital rendering by Zann Gates (May 2011)
Resources and References


The Postharvest Education Foundation
www.postharvest.org
postharvest@postharvest.org
Thank you!
Check the recording of the webinar*:

https://fao.adobeconnect.com/_a1026619000/pylsx3n7x4ro/?proto=true

(*you may need to download and install Adobe Connect on your computer to watch this video.)