

# Capacity Building in Small-scale Postharvest Handling Technologies

The Postharvest Education Foundation

&

AVRDC – The World Vegetable Center

A presentation for ECHO Biennial Symposium on Sustainable Agriculture

Arusha, Tanzania

3-5 February 2015

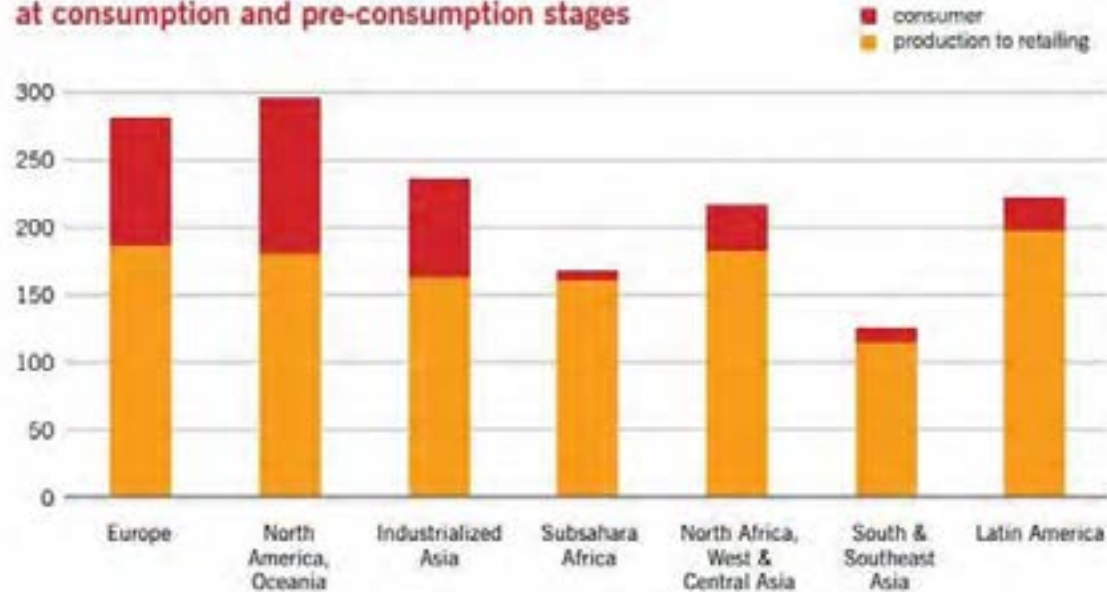


# Capacity Building in Small-scale Postharvest Handling Technologies

- Presentation by:
  - Mr. Philipo Joseph(AVRDC) and Dr. Lisa Kitinoja (PEF)
  - philipo.joseph@worldveg.org
- The Postharvest Education Foundation, a 501 (c)3 NGO, USA
- AVRDC –The World Vegetable Center

# Global Food Losses and Waste

Per capita food losses and waste (kg/year),  
at consumption and pre-consumption stages



FAO statistics @FAOstatistics Jun 2

Per capita food loss and waste (kg/year) at consumption and pre-consumption stages

## Global Postharvest Loss Percentages

**29% of staples**

- Rotate pantry goods to avoid 'hidden' or forgotten items
- Donate large quantities of unused food to food pantries and soup kitchens

**42% of fruits & veggies**

- Repurpose vegetable trimmings as bases for soups, sauces, and stocks
- Make smoothies and juices with assorted fruits and vegetables

**19% of meat**

- Keep track of expiration dates to avoid spoilage or freezer burn
- Store immediately to increase shelf life

**30% of fish & seafood**

- Learn and use proper preparation techniques to avoid prep error waste
- Use leftovers to make new dishes

**15% of milk**

- Serve in small quantities, especially to kids
- Prepare and freeze pastry or other milk-based dough to use up excess

### Things we can do:

- Shop at home first – use items from your cupboards before buying more
- Make a list before going to the grocery store, and buy in quantities as needed
- Order portion sizes you can finish or take home from restaurants

Source: FAO/WHO, 2013

Food Loss and Waste Reduction: A Practical Guide

FAO/WHO, 2013

Food Loss and Waste Reduction: A Practical Guide



# Capacity Building – knowledge and skills in appropriate small scale postharvest technologies



- Appropriate & small scale
- Low cost
- Cost effective for smallholders
- Easy to try
- Can make instead of have to buy



# Reducing postharvest losses requires knowing more about **the causes and sources of losses**

- Rough handling
- Poor quality packages
- Temperature abuse (too hot or too cold)
- Exposure to the elements (ex: low humidity)
- Pests
- Delays



# The Postharvest Education Foundation

The Postharvest Education Foundation's mission is to provide innovative educational programs that motivate and empower people to reduce food losses



- Website
- Training materials
- Mentoring
- E-learning program
- Short courses
- White papers
- Workshops

# AVRDC – The World Vegetable Center

## About AVRDC

- AVRDC – The World Vegetable Center is an international non-profit research and development institution committed to alleviating poverty and malnutrition in the developing world through the increased production and consumption of nutritious and health-promoting vegetables.



# AVRDC Locations





# AVRDC R4D: Four global themes

## Germplasm

Germplasm conservation,  
evaluation and gene discovery

## Breeding

Genetic enhancement, varietal development,  
selection of indigenous lines, seed production

## Production

Safe and sustainable vegetable  
production systems

## Consumption

Postharvest management and market  
opportunities; nutritional security, diet  
diversification and human health



# AVRDC & PEF: Partnership in Postharvest issues

- AVRDC , in different postharvest projects provide a one stop shop for research & scaling-up of small scale postharvest technologies as well as training wherever pertinent in its widespread projects regions in Tanzania, Africa and the worldwide
- PEF provided support for AVRDC project work for Hort CRSP/USAID Funded by
  - ✓ sending volunteers from the USA to work on the set up of the PTSC and the demos
  - ✓ bringing e-learners from many countries to Arusha and to AVRDC for workshops in 2013/14 short course/study tour 2015).
  - ✓ AVRDC will be one of the site visits for the PEF 2015 Feb short course, One invited speaker from AVRDC
  - ✓ AVRDC provide the tour bus for the participants
  - ✓ PEF trained several of AVRDC's field staff in postharvest technologies and extension practices via e-learning, 2 are participating in the 2015/16

# PEF Postharvest E-learning Programs

- Since 2012, PEF has provided mentor guided “e-learning” programs in small-scale postharvest technologies
- 1 year of self-paced learning
- 10 assignments
- 60 young hort professionals from 20 countries have participated and graduated as “postharvest specialists”

## TOPICS

- Commodity Systems Assessment
- Small-scale postharvest handling practices, tools and equipment
- Designing postharvest demonstrations
- Designing postharvest training programs
- Calculating costs and benefits of improved postharvest technologies

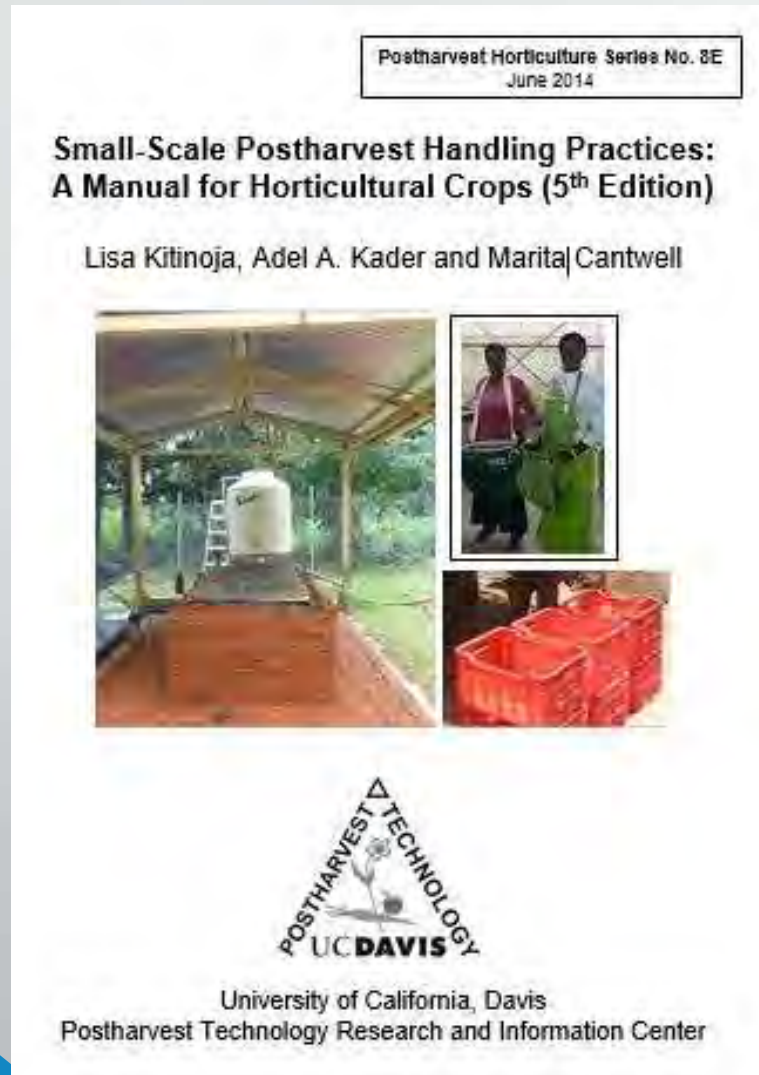
✓ 3 AVRDC staff in 2013/14

✓ 2 new staff joined the 2015/16 course

✓ Reach small holder farmers in various projects regions



# Appropriate scale postharvest technologies



Training materials suited for East Africa are available online and on CD

- UC Davis Postharvest Horticulture Series No. 8 manual (English, Swahili)
- Energy use in horticulture guidebook
- Cost/benefit examples and worksheets
- PEF White Papers on Use of plastic crates, CSAM, and Cold chain development
- Video links for postharvest handling practices, food processing methods

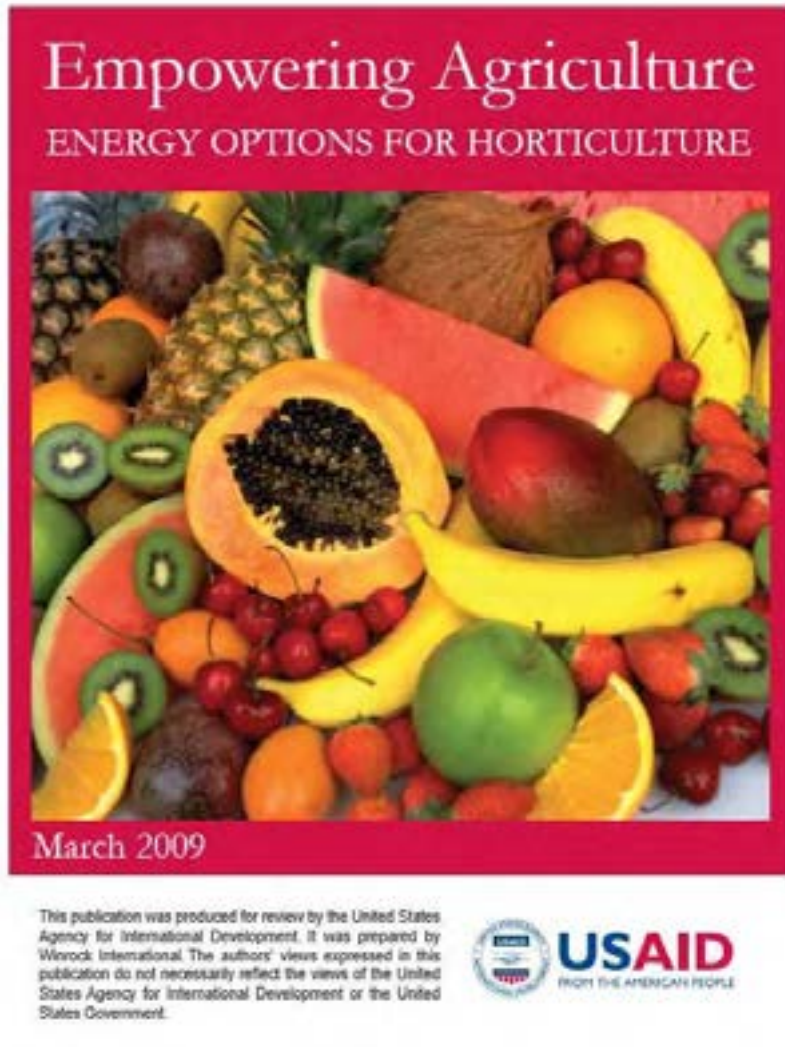
# Small scale postharvest handling practices manual

## 11 chapters

- Harvesting
- Curing
- Packinghouse operations
- Packing and packaging materials
- Postharvest pest management
- Temperature and relative humidity management
- Storage
- Transport
- Retail distribution
- Processing
- Food safety

- Available for free download in 12 languages, including English, French and Kiswahili

# Energy use in horticulture guidebook



- Appropriate small scale postharvest technologies
- Information on Costs and Benefits
- Selecting options based upon access to electricity, diesel fuel, alternative energy sources



# Determining Costs and Benefits

- Examples based upon 21 field trials in Africa and India
- Cost/benefit Worksheets to determine comparative benefits and Return on Investment
- Knowing the local costs and benefits provides useful information for farmer decision making and extension program development

## COST BENEFIT WORKSHEET

Assume harvest 1000 kg

	Current Practice	New Practice
Describe:		
COSTS		
Relative cost		
EXPECTED BENEFITS		
% losses		
Amount for sale		
Value/kg		
Total market value		

# PEF Short courses/study tours



17-21 August 2014 in Bali, Indonesia  
22-27 February 2015 in Arusha, Tanzania  
December 2015 (in planning stage for Kenya)  
2-6 February 2016 in Bali, Indonesia

[www.postharvest.org](http://www.postharvest.org) for updates  
and registration information



**Small Scale Postharvest Handling Technologies  
Short Course & Study Tour: 22-27 February 2015**



Arusha, Tanzania  
The Postharvest Education Foundation  
[www.postharvest.org](http://www.postharvest.org)

# PEF postharvest research/field trials

- Modified atmosphere packaging (MAP) for vegetable crops



- Zero energy cool chamber (ZECC) for temporary storage of fresh produce is being demonstrated in Ethiopia, Tanzania, Ghana, Nigeria and Pakistan





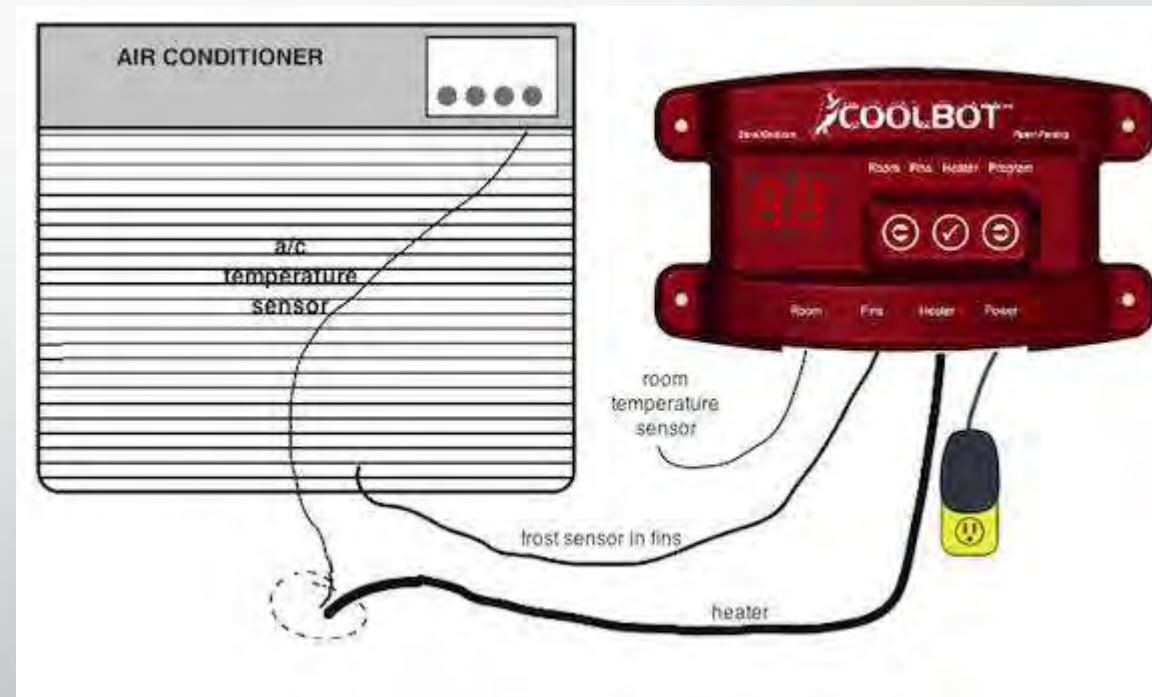
# Low cost cooling and storage for fruits and vegetable crops

- Technical support and advice on the development of the WAKATI

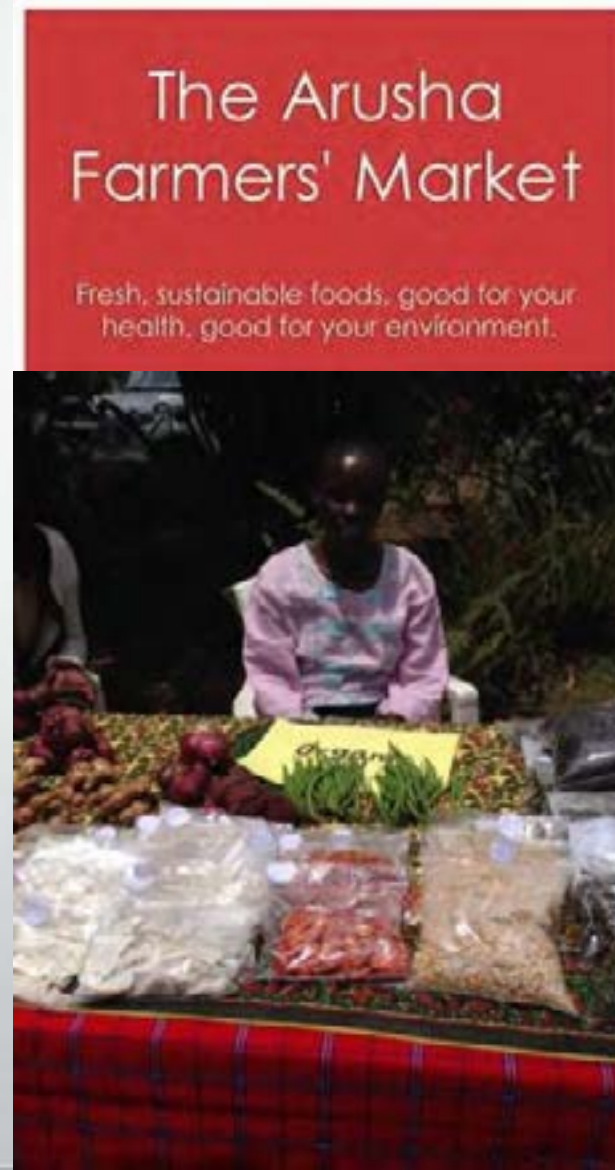


WAKATI – a high humidity storage chamber  
cost = \$US 100; storage life enhanced by 2x to 4x

- Technical support for use of the low cost cold storage technology “COOL-BOT”
- Cost is 1/10<sup>th</sup> of a commercial cold room



# Postharvest / food processing / marketing



PEF provides technical support and training on

- Solar driers (designs, construction, maintenance)
- Solar drying methods
- Food safety
- New product development
- Improved packaging of dried products
- Marketing strategies



# Postharvest Capacity Building in East Africa

PEF trained  
“postharvest specialists”  
are working in:

- Ethiopia
- Kenya
- Rwanda
- Tanzania
- Uganda
- Zambia





## POSTHARVEST CAPACITY BUILDING IN ARUSHA PTSC LOCATED AT AVRDC

### A. Through Hort CRSP Project (2012/13-One year)

- Around 637 small scale farmers and processors from around Arusha and Moshi (407 women and 230 men) have been reached with the intensive postharvest handling training and application of simple and appropriate postharvest technologies

### B. Through AVRDC Postharvest projects and other project with postharvest component only in 2014

- Over 200 small scale farmers in Arusha, Lushoto- Tanga region , Babati-Manyara region and Morogoro received training on general postharvest handling training



# Thank you

For more information on PEF and Global postharvest e-learning programs

- [www.postharvest.org](http://www.postharvest.org)
- Dr. Lisa Kitinoja  
([kitinoja@postharvest.org](mailto:kitinoja@postharvest.org))

For more information on AVRDC Postharvest program (PTSC) and the like

- [www.avrdc.org](http://www.avrdc.org)
- Dr. Ngoni Nenguwo (Postharvest specialist)
- ([ngoni.nenguwo@worldveg.org](mailto:ngoni.nenguwo@worldveg.org))