

Post harvest care of vegetables

From farm to market and fork

Why?

- Vegetables are high income and nutritious
- Post harvest affects nutrition as well as sales and income
- Vegetable losses can be high - 9-25% due to:
 - Improper packaging and washing
 - Improper transport
 - Leaf breakage and crushing
 - Fruit cracking and rotting

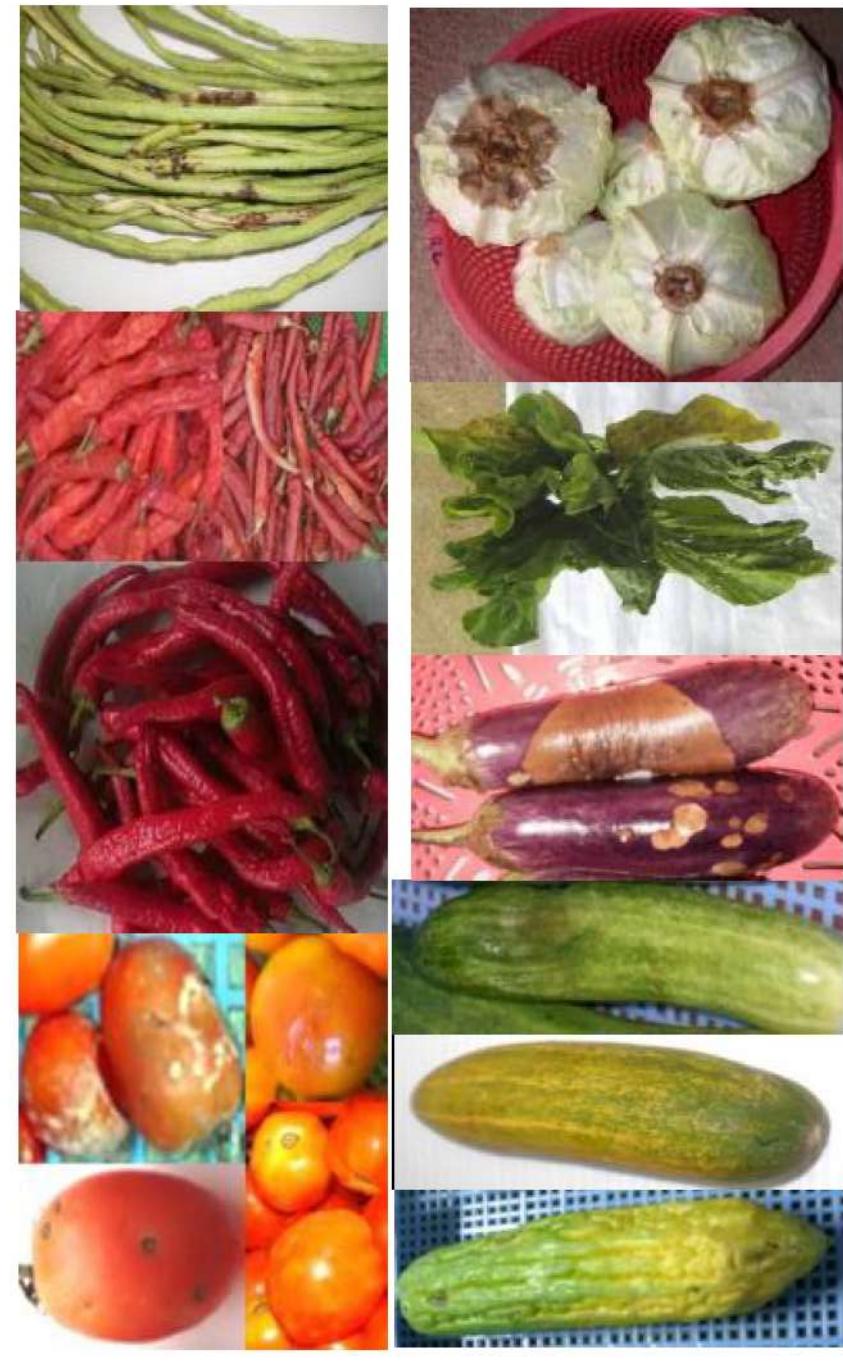
Reducing loss

- Harvests are living
 - > They respire, lose water, produce ethylene and react to the environment
 - > They are food to microorganisms that cause spoilage and human illness
 - E coli
 - Salmonella



Quality loss

- Over-ripening
- Yellowing
- Shriveling
- rotting



Harvest at the right time

- Quality cannot be improved after harvest
- Must harvest at optimum maturity
 - Not too old or too young

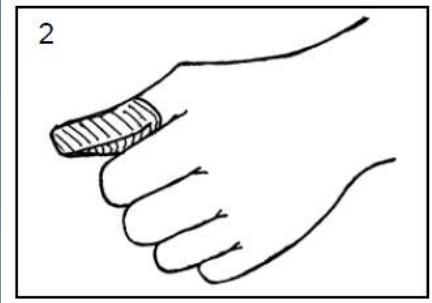
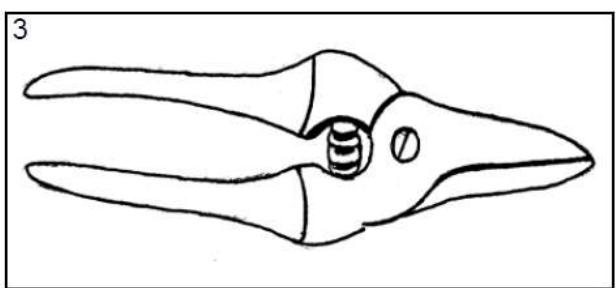
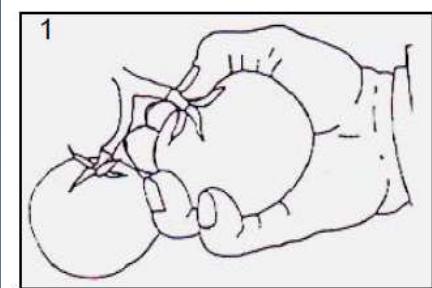


When to harvest

- Cooler times of day
- Early mornings – plants are brittle and prone to damage
- Not just after rain or during
 - Too wet favors spoiling
 - Must wash and dry

Harvesting Methods

- Handpicking minimizes damage
- Smooth surface and small harvest containers



Harvest containers

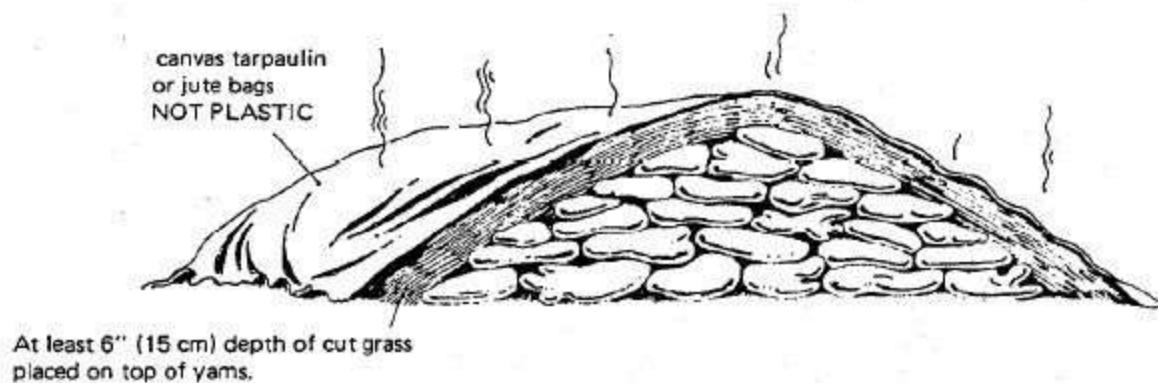
- Plastic desirable
- Line rough containers with newspaper
- Avoid contact with soil
- Handle with care!



Field curing

Yams and other tropical root and tuber crops can be cured outdoors if piled in a partially shaded area. Cut grasses or straw can be used as insulating materials and the pile should be covered with canvas, burlap or woven grass mats. Curing requires high temperature and high relative humidity, and this covering will trap self-generated heat and moisture. The stack should be left for about four days.

Cut-away view of yam curing



Cleaning

- Cleaning – remove adhering soil and debris
- Sort out damaged, diseased, off-shape and off-sized products
- Each vegetable is different
 - › Eggplant: trim fruit stem end
 - › Cabbage: trim stem end, remove wrapper leaves, except for 3-4 for protection
 - › Tomato, cucumber, eggplant: wipe with soft, clean cloth

sorting

○ Sorting/grading

- Preserves produce quality by preventing microbial contamination and ethylene effects
- Can increase income by 40-60%
- Classify according to grades or classes based on sizes and maturity

Storing and packing

○ Storage

- › Bamboo baskets
- › plastic baskets and crates
- › Wooden crates

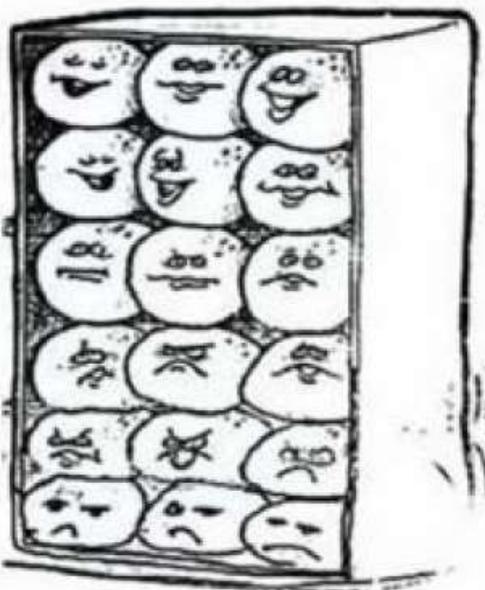
○ Protective packaging

- › Newspaper wraps
- › Keep

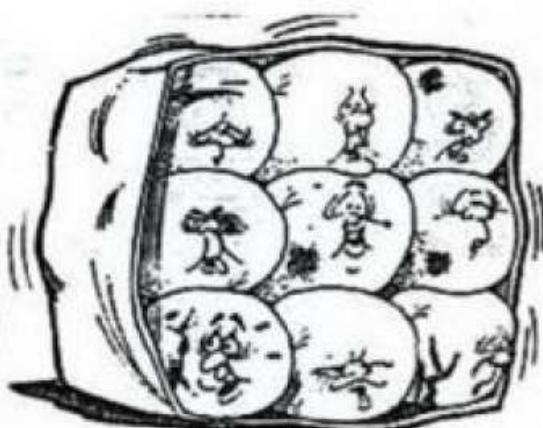
Packaging

- Use clean containers
- Fill to capacity
 - › Under = more vibration damage
 - › Over = more compression damage
- Immobilize in container
- Pack all one maturity
- Secure box
- Pack and stack in cool place

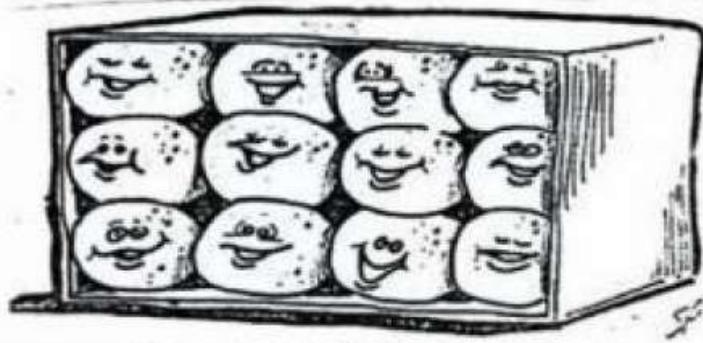




Too deep package



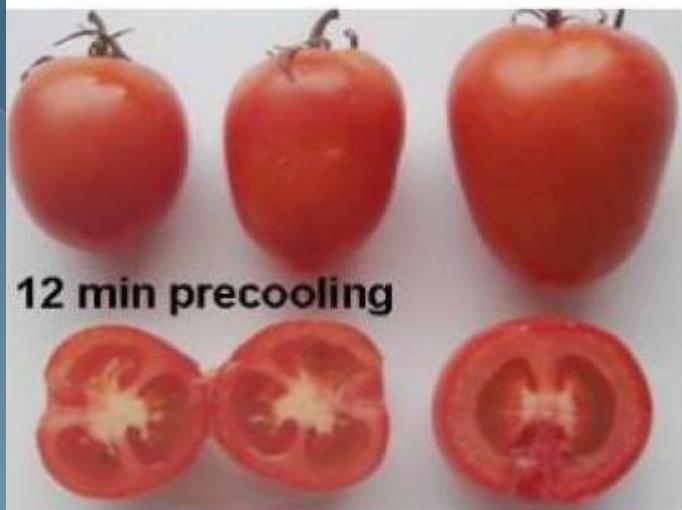
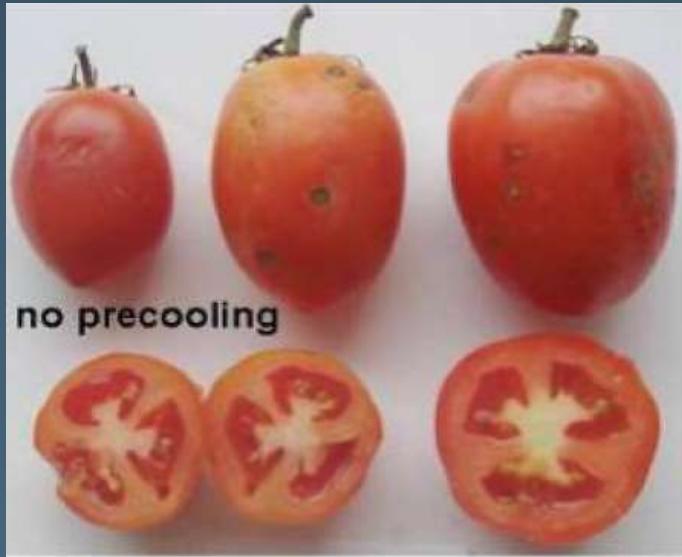
Overpacking



Recommended packaging

temperature

- Cooling protects quality and increases storage life
 - > Avoid sun
 - > Harvest at cooler times of day
- Cold storage or dipping in cold water helps cool
- Evaporative cooling by sprinkling with water



packaging

- Modified atmosphere
 - Lowers oxygen, higher CO₂
 - Creates humid condition
 - Polyethylene or poly-propylene films
- Reduces water loss
- Increases profit

Modified atmosphere packaging (MAP)

- ◎ low-density polyethylene,
high-density PE and
polypropylene bags
 - Sort good quality and
damage-free vegetables.
 - Place vegetables inside the
plastic bag and seal.
 - Store at ambient
temperatures for 6-10 days or
until when first sign of decay
is observed.



transport

- Evaporative cooling
 - > Wet cloth cover
- MA film cover
- Separate layers
- Ventilation
- Cover from sun, rain, strong wind
- Easing loading and unloading minimize damage
- Immobilize to prevent vibration



Sanitation and hygiene

- Dispose of rotten/spoiled produce
- Clean and sanitize storage containers, preparation areas and display bins with 200 ppm chlorine water
- Cover ground with canvas mats or use baskets, trays or bins
- Display produce packed in plastic bags

Keeping Food Safe

- Consider personal hygiene of food handler/seller
 - Wash hands
 - Avoid direct contact with animals
 - Try to keep away when sick

Should I store together?

Ethylene-Sensitive Vegetables

- Arugula
- Green onion
- Green tomato
- Kale
- Leek
- Lettuce
- Long bean
- Mint

Ethylene-Producing Fruits

- Apple
- Apricot
- Asian pear
- Avocado
- Banana
- Cantaloupe
- melons
- Fig
- Kiwifruit
- Mango
- Nectarine
- Peach
- Pear
- Plum
- Prune
- Quince

- Mushrooms
- Okra
- Parsnips
- Potato
- Peas
- Spinach
- Summer squash
- Turnip greens

storing

- Clean
- Air
- Light?
- Safe from insects and animals