

Specialized structure

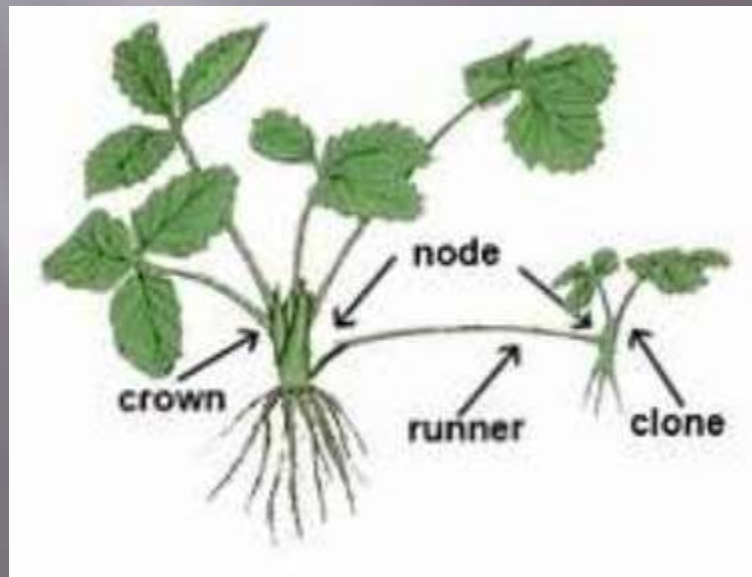
# Specialized vegetative structures

- Runners (stolons)
- Bulbs
- Corms
- Rhizomes
- Tubers
- Sucker

- Runners (stolons) – Above ground running stems
- Nodes new plants formed at each node
- Eg. Strawberry

## (e) RUNNER:-

Runners are horizontal stems growing from the parent plant, but they grow above ground. When their terminal buds touch the ground they take root and produce new plants. Examples- strawberry.



- Bulbs (underground)
- A specialized underground organ consisting of a basal plate, growing point, flower primordia and fleshy scales
- Found in monocots
- Tunicate bulb: Onion, garlic
- Nontunicate bulbs: Easter lily, Oriental lilly.

# Difference between tunicated and non-tunicated bulb

## TUNICATED BULB

1. Form concentric rings around growth point.
2. Have protected tunic layer of dried ring layers.
3. Not easily damaged during digging.



## NON-TUNICATED BULB

1. Do not form concentric rings around growth point.
2. Not protected by tunic layer of dried ring layers.
3. Damaged during digging.





Contd.



**ONION BULB**



**GARLIC BULB**



**DAFFODIL BULB**



**TULIP BULB**

➤ Along with bulb, small underground bulbs are produced which are known as *bulblets*.

➤ The bulblets when grow to full size are termed as *offset*. Examples- Agave, Aloe, Sansevieria, Sedum etc.





➤ The bulblets which are produced in the aerial portion of stem are termed as bulbils. Examples- *Lily, Agave* etc.



**AGAVE**



**LILY**

- Rhizomes: (laterally grown underground stem)
- Eg. Ginger
- Offshoots: Lateral shoots often with roots at the base, produced on main stem, which can be separated and grown as independent plants.

## (d) RHIZOME:-

It is specialised stem structure which grows horizontally at or just below the ground surface. It bears nodes and internodes. Examples- banana, blueberry, iris etc.



**BANANA RHIZOME**



**BLUEBERRY RHIZOME**



**IRIS RHIZOME**

- Stem Tuber: eg. Potato
- Tuber is swollen, modified stem structure, functions as an underground storage organ.



## (b)TUBER:-

A tuber is a specialised swollen underground stem which possesses eyes in regular order over the surface. The eyes represent the nodes of the *tuber*. *Examples:-*  
potato, jerusalem  
artichoke, dioscorea, irish potato etc.



contd.



**POTATO  
TUBER**



**JERUSALEM ARTICHOKE  
TUBER**



**DIOSCOREA TUBER**



**IRISH POTATO  
TUBER**

## (c) CORM:-

It is a swollen solid specialised underground structure which possesses distinct nodes and internodes. It remains enclosed by the dry scalelike leaves. Examples- *Gladiolus*, *Crocus* etc.



**GLADIOLUS  
CORM**



**CROCUS CORM**

## (g) SUCKERS:-

Sucker is a term for a basal shoot that grows from the base of a tree or shrub. Example- pineapple, banana, pear etc.

### BANANA SUCKERS



Pineapple  
sucker



# Post harvest handling

- To maintain quality (texture, nutritive value, flavour)
- To reduce losses between harvest and consumption



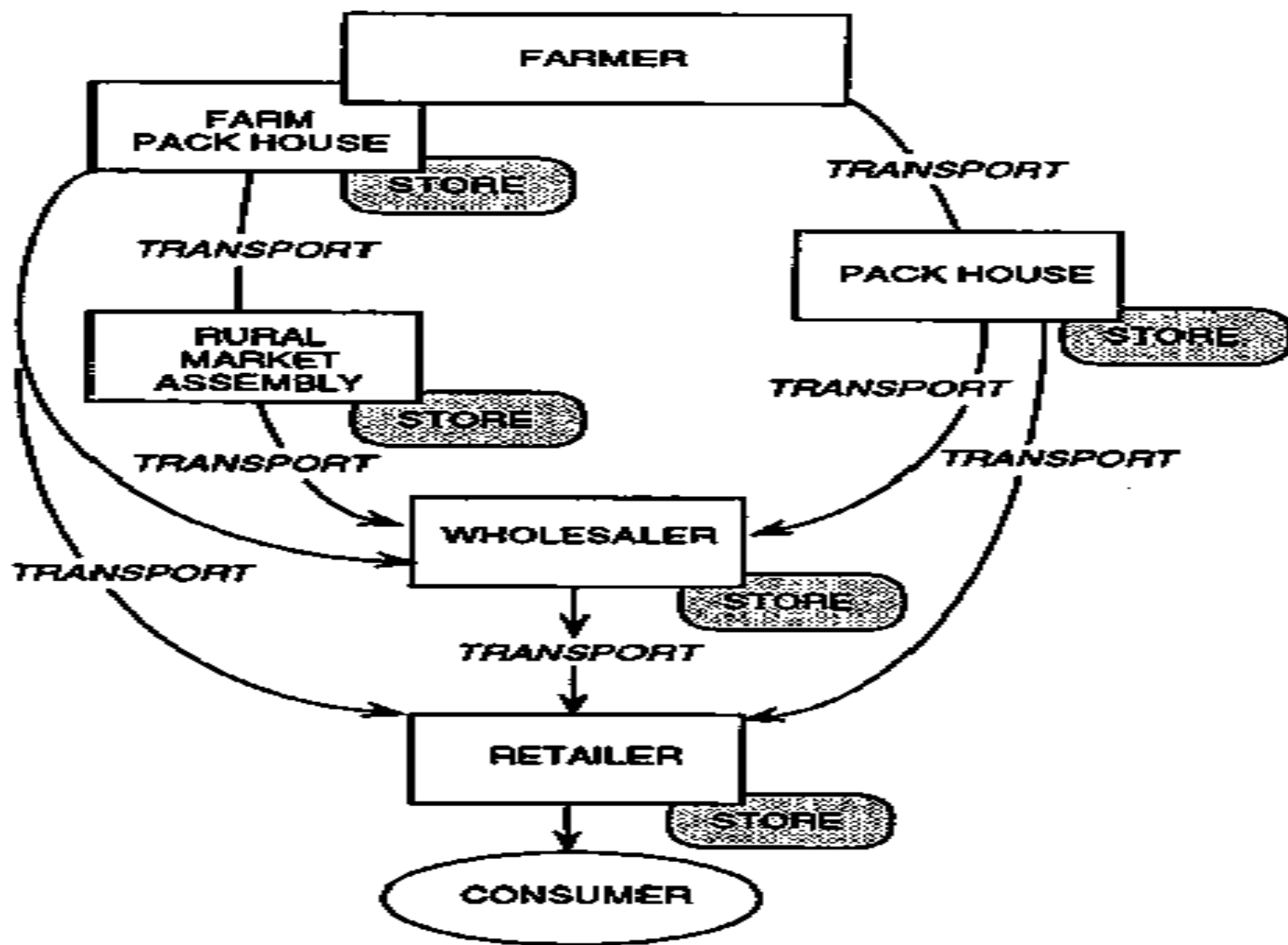
**quality products are produced  
in the fields!**



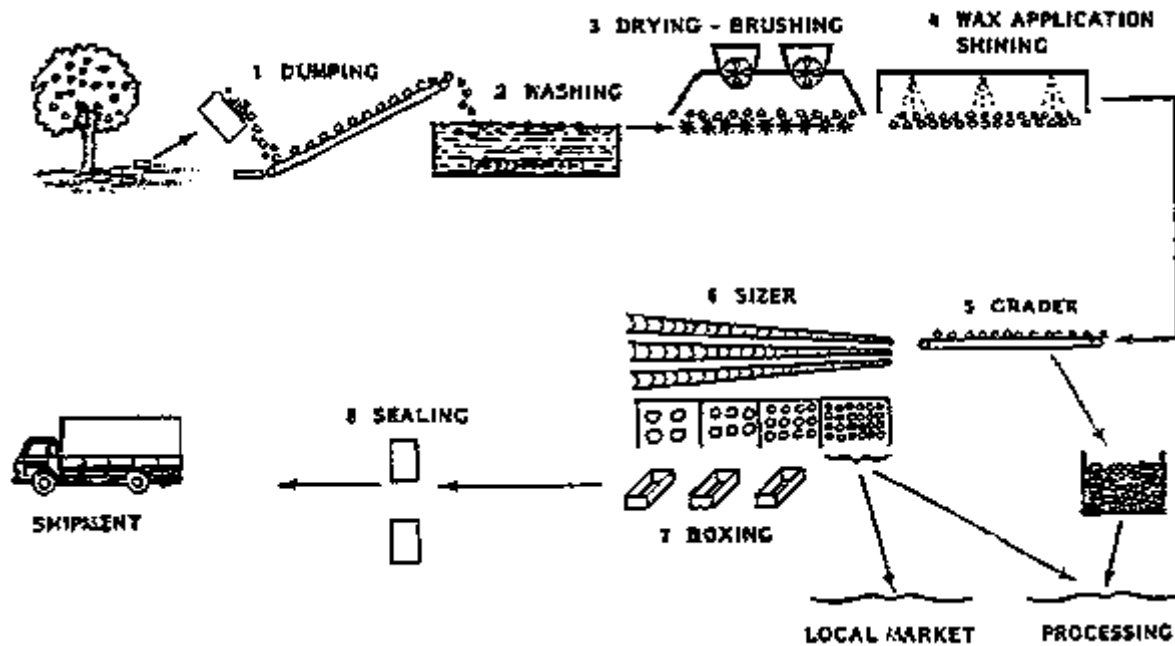
**but, the quality of a product  
is maintained and enhanced during  
its harvest and post-harvest management.**







# POST HARVEST HANDLING



# Fruits

1. HARVESTING
2. PRE-COOLING
3. SORTING
4. WASHING
5. WAXING/CHEMICAL TREATMENT
6. SIZING
7. PACKAGING
8. STORAGE
9. TRANSPORTATION
10. WHOLESALE
11. RESTORING, RESIZING & REPACKAGING
12. TRANSPORTATION
13. RETAILER
14. CONSUMER

# Vegetables

1. HARVESTING
2. PRECOOLING
3. CLEANING
4. TRIMMING
5. GRADING
6. SORTING
7. CURING
8. SIZING
9. WAXING
10. PACKAGING
11. TRANSPORTATION
12. WHOLESALER
13. TRANSPORTATION
14. RETAILER
15. CONSUMER



- Pre-cooling
- Removal of field heat

A green brushstroke graphic with a black shadow, containing the word "Temperature" in white text.

# Temperature

- Key factor affecting product deterioration rate.
- is the most effective tool for extending the shelf life of fresh horticultural commodities.
- Key effect on spores germination and pathogenic growth.

- Washing, cleaning and trimming:
- Cleaning methods includes removal of soil dust, adhering debris, insects and spray residues, fungicides like *Diphenylamine* (0.1-.025%) or *Ethoxyquin* (0.2- 0.5%) may be used as superfical scald. For cleaning of some fruit type vegetables (melons, brinjals, tomatoes, cucumber) they should be wiped with damp cloth. Some vegetables need trimming, cutting and removal leaves or other vegetative parts

- Sorting, grading and sizing
- Sorting done by hand to remove fruits which are unsuitable to market and damage due to insect etc.,
- Then graded in to two or more grades
- In India apples are graded Extra fancy, Fancy, standard
- Sizing based on fruit size and shape.







# Cooling methods

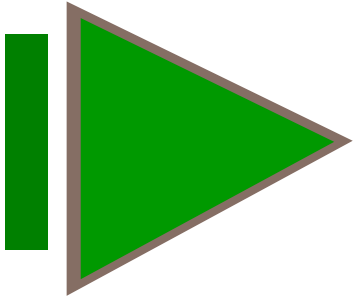
Comparison among cooling methods

|                                | Cooling method |         |         |            |         |
|--------------------------------|----------------|---------|---------|------------|---------|
| Variable                       | Ice            | Hydro   | Vacuum  | Forced-air | Room    |
| Cooling times (h)              | 0.1-0.3        | 0.1-1.0 | 0.3-2.0 | 1.0-10.0   | 20-100  |
| Water contact with the product | yes            | yes     | no      | no         | no      |
| Product moisture loss (%)      | 0-0.5          | 0-0.5   | 2.0-4.0 | 0.1-2.0    | 0.1-2.0 |
| Capital cost                   | high           | low     | medium  | low        | low     |
| Energy efficiency              | low            | high    | high    | low        | low     |

Source: Kader & Rolle (2003)

- Curing: Effective operation to reduce water loss during storage
- At particular temperature and specific time
- Waxing: To retain quality (fatty acid esters)
- Parafin wax, bee wax, Wood resin etc.
- Packaging: Proper packaging reduces wastage of commodities
- To maintain quality.

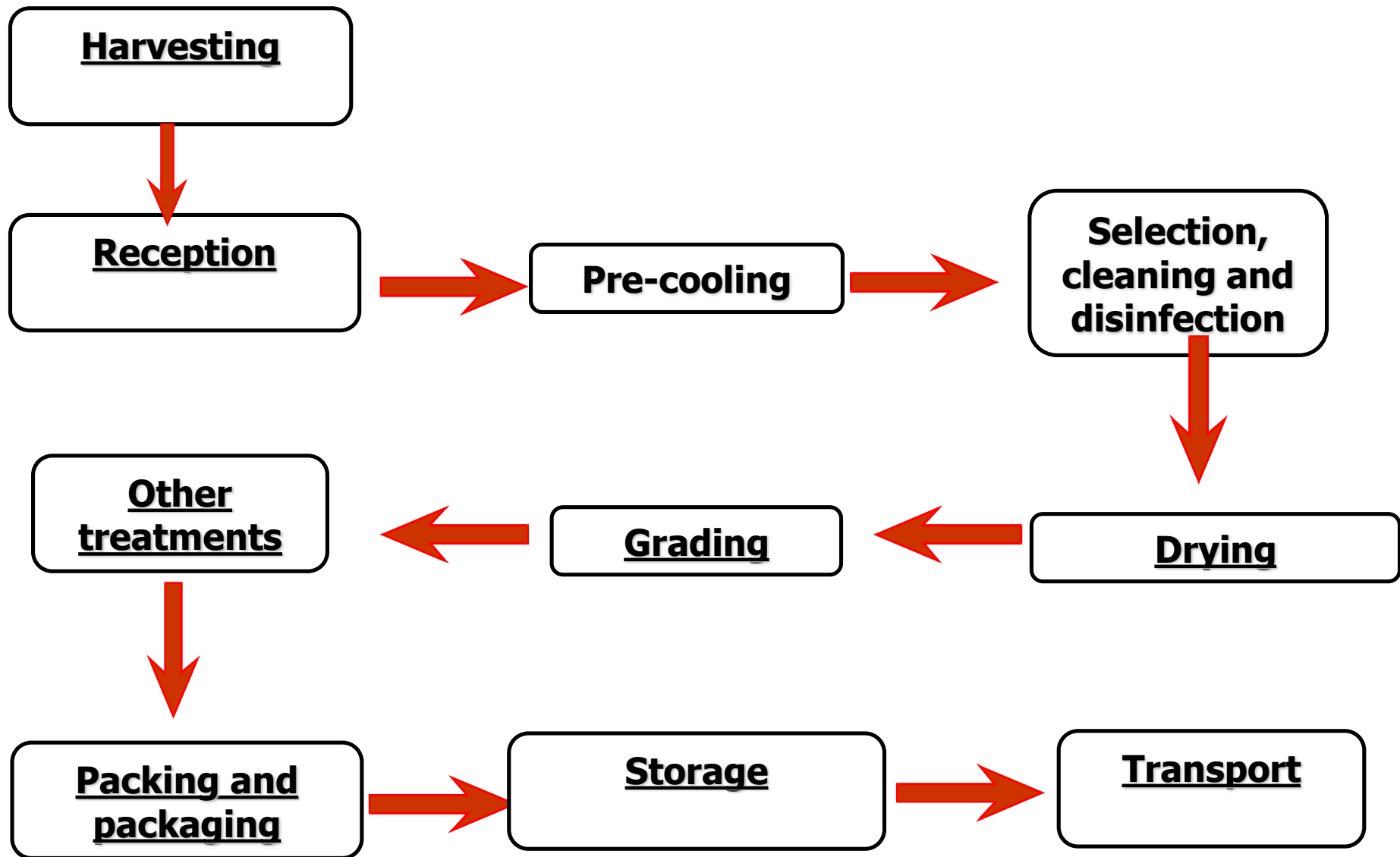




# Storage and refrigerated transport

- refrigerated coils surfaces designed to adequately minimize differences between the coil and air temperatures.
- proper air spaces between pallets and room walls to ensure proper air circulation.
- monitoring temperature (product rather than air temperature).

# Post-harvest procedures



- Thank You

















