

Harvest & Post-Harvest Handling for **RAMBUTAN & LANZONES**



INTRODUCTION:

Both lanzones and rambutan are tropical fruits usually grown for commercial purposes. They are well-loved by many particularly the children because of the fruit's sweet and juicy texture.

In the Cordillera Administrative Region (CAR), these fruits are grown and highlighted on special occasions such as the Fruit Basket Festival. Various agroforestry people's organizations (POs) assisted by the Department of Agriculture - Second Cordillera Highland Agricultural Resource Management Project (CHARMP2) Scale-up have also chosen to plant lanzones and rambutan in their committed agroforestry plots in support to the partner local government units in the promotion of agroforestry in slope areas.

After several years, the POs are expected to harvest their first produce of lanzones and rambutan. This technoguide then aims to present the harvest and post-harvest handling practices to guide the farmers/growers as they harvest and market their produce.

Rambutan (*Nephelium lappaceum L.*):

Considered as one of the promising commercial crops, rambutan is an exotic fruit native to Malaysia which was introduced to many tropical countries including the Philippines during prehistoric times through seeds (Business Diary Philippines). It is a medium-sized tree producing red or yellow fruit that is round to oval in shape with hairs or tubercles on its skin. Generally, it is described as a hairy fruit and is usually eaten raw and has a distinct taste and texture.

Lanzones or Langsat (*Lansium domesticum*):

An edible tropical fruit that is native to the Southeastern parts of Asia. The fruits may be round, oval or elliptical in shape, always appearing in clusters, just like grapes. The fruits look like round potatoes with its thin, leathery yellow skin that is easy to peel. Inside the skin is the translucent white, juicy fruit divided into five or six sections.



HARVESTING OF FRUITS



The proper time for harvest varies with climate, variety and intended use by buyers/consumers. For domestic or home consumption, fruits are better harvested at the peak of its maturity period to attain the best flavor and nutrition.

For market or trade purposes, fruits must be harvested before they reach their maximum maturity to allow for longer expected shelf life.

LANZONES:

Harvesting is usually done when all the fruits in a cluster or fruits in the tree are fully ripe.

The best index to check for maturity and ripeness of fruit is when the color of the stalk changes from green to brown or when the skin of the fruits turns to brownish yellow.

The flesh is translucent when ripe. Fruit on the bunch generally ripen together within a short period of time.

Harvest the fruits as it mature and ripen. It is essential to harvest as soon as possible, as over-ripe fruit abscise from the peduncle.

RAMBUTAN:

Skin and spine coloration is the main identification for maturity index. Depending on variety, the fruit's skin and spine are either in full red or yellow colors. Fruits with green skin and greenish-red spines are sour.

It is recommended to harvest the fruit when both the skin and spines are brightly colored.

Overripe fruits have watery texture which may be a senescence-induced tissue breakdown.



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HARVEST HANDLING

Proper harvest handling is required in order to limit or prevent possible damages and contamination of the fruits. It is one of the most important operations in plant production that decides the quality as well as the storage life of harvested fruits.

Fruits, just like vegetables and flowers, must be in excellent condition and have excellent quality if maximum shelf life is desired. Best quality of produce exist at the moment of harvest.

MATURITY INDEX

The **maturity index** is a measurement or measurements that can be used to determine or predict the maturity of fruits.

The principles that dictates at which stage of maturity a fruit should be harvested are crucial to its subsequent storage, marketable life and quality. Post-harvest physiologists distinguish three stages in the life span of fruits as **maturation, ripening, and senescence**.

- **Maturation:** Indication that the fruit is ready for harvest. The edible part has fully developed in size, although it may not be ready for immediate consumption. Maturity, in horticulture, is the stage of development at which a plant or plant part possesses the prerequisites for use by consumers in a particular purpose.
- **Ripening:** Follows or overlaps with maturation, rendering the produce edible and more palatable as indicated by taste.
- **Senescence:** The last stage characterized by natural degradation of the fruit or vegetable, as in loss of texture, flavour, etc.



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Here are some physical indeces (characteristics) used to measure whether the fruit is mature for harvest:

TEXTURE

A fruit may change in texture during maturation, especially during ripening when it may become rapidly softer. Excessive loss of moisture may also affect the texture of crops. These textural changes are detected by touch, and the harvester may simply do it by gently squeezing the fruit and judge whether the fruit is ready for harvest.

AROMA

Most fruits synthesize volatile chemicals as they ripen. Such chemicals give fruit its characteristic odor (usually fragrant and aromatic smell exuding from the fruit) and can be used to determine whether the fruit is ripe or not. The smell may only be detectable to people when the fruit is completely ripe, and therefore has limited use in commercial situations.

SIZE

One general indication that a fruit may be mature is when it becomes significantly bigger in size. But for lanzones and rambutan, they may already be matured even if they have not become significantly bigger.

SHAPE

The shape of fruit can change during maturation wherein it becomes fuller. In rambutan, the shape becomes either fully round or long and elongated. For lanzones, they are usually round in shape.

SKIN COLOR

Skin color changes as fruit ripens or matures. Generally, the fruit losses its green color due to the degradation of the chlorophyll structure, a green pigment in plants. In rambutan, its color changes to bright yellow, red or yellow with orange blush depending on the cultivar while lanzones generally turns into yellow. The bright and full color changes indicate maturity in fruits.





Harves

The following are some guides and recommendations when you finally decided to harvest your fruits:

A. Best time to harvest:

- Harvest fruits in their optimum maturity or depending on the intended use to ensure quality. Rambutan and lanzones are both non-climacteric fruits which means that these are not capable of continuing the ripening process when harvested from the tree.
- Harvesting is best done in the early morning or late afternoon to protect the fruits from the sun's heat intensity.
- It is recommended to harvest the fruits when dry, as it can become moldy or contaminated if harvested wet.

B. Harvesting materials/tools:

- Use non-absorbent, durable, and washable materials and containers for harvesting. Use liners as needed to protect the fruits, especially for containers with rough surfaces. This is also helpful in protecting the fruits from possible bruises or injuries caused by rugged terrains when transporting it to the packing house.
- Use sharp knife or scissor in harvesting.
- Clean and sanitize harvesting tools and baskets before and after using.
- Use a ladder in harvesting the fruits to avoid climbing the tree in order not to damage the fruiting buds.



Harvesting Tips:

C. During harvest:

- Observe proper care and management of the fruits to avoid rough handling such as bruising that may degrade/damage the fruits, thus, affecting its shelf life and marketability.
- Remove as much dirt and debris from the fruits as possible.
- Discard immediately the undersized, damaged, diseased and half colored fruits.
- Keep part of stems intact to the fruit.



C. Right after harvest:

- Place harvested fruits in elevated areas. Keep it away from direct contact with the soil or floor.
- Keep harvested fruits under shade, preferably covered, to keep it from drying up. Do not leave the fruits in an open area at night to prevent adding moisture to the fruits.

WHAT IS POST-HARVEST HANDLING?

Post-harvest handling helps in maintaining the quality and safety of harvested fresh products in order to prevent possible losses. Reduction in post-harvest losses means increased food availability for the growing population. (www.fao.org)

Post-harvest handling specifically involves the movement and operations that the commodities undergo from harvest to meal preparation. Its main concerns are:

- to keep commodities in an acceptable state from harvest until it reaches the consumers;
- to ensure food safety; and
- to minimize losses at the least possible cost.



Post-harvest is related to or occurring in the period of harvest

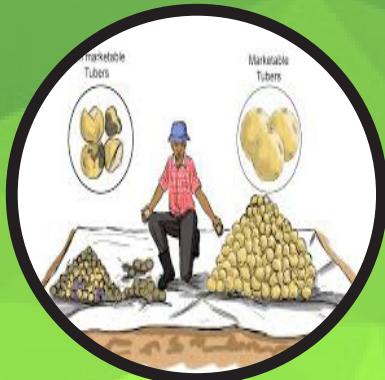
- Proper post-handling practices for fresh products like fruits is important because of the following:
 - these are considered as high value crops and that they have higher market value;
 - these are commodities that deteriorate in quality very quickly;
 - money and other resources were invested in growing the commodities, and
 - these are rich source of vitamins, minerals, plant proteins and medicinal substances, thus, proper care helps in maintaining the nutritional and pharmacological value.

Proper post-harvest handling practices:

1. SORTING

Sorting is the process of arranging or grouping the commodities according to their similarities. Sorting is done primarily to grade the fruits according to given parameters such as size and shape. Generally, freshly harvested fruits are sorted according to uniformity in size, shape and color.

During the harvesting of fruits, pre-sorting have already started wherein the fruits with undesirable appearances such as skin blemishes, discolorations, decayed, over-ripe or irregular in shape are sorted out from the rest of the harvest. These kind of fruits may detract or pose a risk for shortened shelf life and/or contamination of fruits if not discarded.



2. CLEANING

Cleaning is done to provide attractive look of fruits with minimal risk of microbial contamination.

Cleaning is done to remove unwanted or undesirable contents from the surface of the fruit such as adhering dust, dirt, and twigs.

Basically, cleaning sanitizes the fruits and avoids possible entry of undesirable contents to enter the packaging and storage areas. This practice can be done through dry or wet method.



Dry Method: Physical removal of unwanted matters from the fruits.

Wet Method: Washing the fruits with clean water. The harvested fruits are soaked in clean water for a certain period of time to remove the ants that are staying in the fruits.

Adequate washing also provides a pre-cooling effect to the fruits.

In washing the fruits, remember the following:

- Wash the fruits gently and prevent them from being bruised or damaged. Discard any bruised or damaged fruit.
- Use potable and clean water in washing the fruits. Change water regularly.
- Wash thoroughly so that no residue will be left in the fruit.



3. AIR-DRYING

Air-drying is the process of removing moisture or excess water by using air. This practice is important so that the fruits will be totally dry and do not become moldy when packed.

Air-drying can be done by putting the fruits on top of clean trays or racks, either plastic or stainless, for some time until they become fully dry. Make sure that the fruits are not exposed to direct sunlight.

The use of forced air through cooling fans or blowers may also be used in drying the fruits faster.

Put the trays or racks on blocks or pallets to allow better air movement around the fruits. Do not lay the materials on the ground.

Materials not recommended to be used in air-drying fruits:

- Screens made from “hardware cloth”, a galvanized metal cloth coated with cadmium or zinc, that may cause harm to people.
- Copper and aluminum screens. Copper destroys Vitamin C and increases oxidation or discoloration in fruits while aluminum tends to discolor and destroy.
- Woods are also fine for making trays but avoid using green woods, pine, cedar, oak or red wood. These woods warp, stain or cause off-flavors in the fruits.

4. GRADING/CLASSIFICATION

Grading or classification is the process of judging the fruits through ranking. Fruits of best quality are ranked first.

Grading is important because it sets the standard and price of the harvested fruits in the market.

Several guidelines are provided for grading of harvested commodities. Usually, grading is manually done based on size, color, maturity, and general appearance such as presence of insect damage, mechanical injury and being free of diseases, among others.

In 2007, the Bureau of Agriculture and Fisheries Product Standard (BAFPS) has come up with a Philippine National Standard for the grading and classification of lanzones.

The lanzones is classified according to its general appearance, quality and condition as follow:

Extra Class: Lanzones of superior quality wherein they are characterized by variety or commercial type. They must be free of defects with the exception of very slight superficial defects, provided that these do not

affect the general appearance of the fruits, the quality, the keeping quality and presentation in the package.

Class I: Lanzones of good quality characterized by variety and/or commercial type. Defects may be allowed, provided that these do not affect the general appearance of the fruits, the quality, the keeping quality and presentation in the package. The total area affected shall not exceed 10% of the total surface area. The defects must not, in any case, affect the pulp of the fruit.

Class II: Lanzones which do not qualify for inclusion in the higher classes, but satisfy the identified minimum requirements. Defects may be allowed, provided the lanzones retain their essential characteristics with regard to the quality, the keeping quality and presentation in the package. The total area affected should not exceed 15% of the total surface. The defects must not, in any case, affect the pulp of the fruit.

Lanzones is also classified according to size and quality tolerance.

5. PACKAGING

Packaging refers to the process by which the fruits are packed accordingly for better transport and distribution in the market.

It is recommended to use regular polyethylene bags and food grade containers for packaging. Food-grade container is primarily made for food storage that is durable, leak-proof and able to be sealed or covered. Other packing materials like wooden crates are also acceptable to secure the individual fruit packages.

Remember:

- Keep the fruits with the same color, sizes and grades together.
- Ensure that the fruits are dry before packing. Moisture in fruits causes bacteria and fungi to develop which will affect the saleability of the fruit.
- Disposable containers should not be re-used for packing.
- Handle the fruits carefully. Arrange the fruits properly and do not squeeze in the packing material.
- Place packed fruits in pallets or blocks.



Wooden Pallets



Pallet Bins



Packed rambutan fruits per kilo ready for delivery.

6. STORAGE

Keeping the packed fruits in storage is done to safeguard it until the time for transport and distribution. It must be noted, however, that the shelf life of both lanzones and rambutan are limited due to wilting, browning and blackening. Thus, they must be transported or marketed immediately as possible. If storage is needed, the fruits must be stored in a cold room to extend its shelf life.

Reminders:

- Keep storage areas clean, safe and protected against the entrance of pests and rodents.
- Place container in pallets or in blocks to keep it from direct contact with the floor. This is to prevent the fruits from taking in the moisture coming from the floor.



The proper transport of fruits from farm to market is important to ensure that the fruits will arrive at its destination in satisfactory condition.

When transporting fruits:

- properly arrange the fruits to allow ventilation within each package.

- it is advisable to transport at night, early in the morning, or late in the evening to reduce deterioration of fruits caused by high temperature.
- make sure that the transport vehicles are adequately clean and/ or sanitized before loading the fruits.
- avoid cross-contamination of fruits from other foods, non-foods and surfaces. Make sure that all areas for loading, unloading, transporting and storage are clean.

REFERENCES:

Grading and classification for lanzones (Bureau of Product Standards, PNS/BAFPS 54:2007)

Code of good agricultural practices (GAP) for fruits and vegetable farming (Bureau of Product Standards, PNS/BAFPS 49:2011)

Food safety for fruit and vegetable farms (Jennifer Coleman and Elizabeth Maynard, 2014, *extension.purdue.edu*)

Technical manual on handling and preservation of fruits and vegetables by combined methods for rural areas (Food and Agriculture Organization for the United Nations, 2003, www.fao.org)

Post-harvest physiology and handling of longkong fruit: A review (Karthikeyan Venkatachalam, 2016, *fruits-journal.org*)

Post harvest handling for rambutan (Mohd, L. and Ibrahim A., MARDI, Malaysia)

Production guide for lanzones (Virgilio Loquias, www.bpi.da.gov.ph)

The role of post-harvest management in assuring the quality and safety of horticultural produce (Adel Kader and Rosa Rolle, 2004, www.fao.org)

*Photos/Illustrations used were lifted from the internet

*This technoguide has undergone review by Mr. Landes B. Teofilo, Agroforestry Watershed Management Assistant Coordinator and Senior Science Research Specialist of DA-RFO-CAR



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