



## Harvesting and Handling of Fruit Crops

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**F**ruit handling and harvesting must be done with extreme care. Only the fruits that are fully mature should be harvested. Before the fruits are marketed, sorting and grading should be regularly conducted to ensure a premium price. Once the fruits have been properly packed, they should be delivered right away to marketplaces. The production of preserved goods can be profitable when using low-grade and cull fruits. It is very uncommon to see contractors and even some growers harvesting immature fruits and dumping them on the markets. The results of this behaviour are detrimental to human health.

**Harvesting indices:** When fruits are harvested at the right stage of maturity, they are of high quality. When harvested, immature fruits will have poor quality and inconsistent ripening. On the other hand, postponing the harvest of fruits may make them more susceptible to decay, which would lead to poor quality and a consequently low market value. Additionally, food should be gathered when it is mature but unripe if it will be transported to distant markets or stored to wait for a better price. Whether the fruit is intended for local consumption or long-distance transportation determines the fruit's level of maturity at the time of harvest. Fruits and their types' maturity indices vary greatly. Mango and bananas are harvested when fully grown, whereas grapes, citrus, and pineapple ripen on the plant itself. To determine and harvest the maturity of various fruits, a number of criteria have been proposed, including firmness, total soluble solids (TSS), acid sugar ratio, flesh colour, starch content, pulp/peel ratio, days after fruit set, etc. However, none of these seem to be used in real life. Traditionally, characteristics such as form, colour, size, scent development, and astringency disappearance serve as indicators of maturity.

**Harvesting:** Manual harvesting is the standard practise. Depending on the type of fruit, different ways must be used to harvest it. Manually harvested green and mature mangoes are lowered to the ground in a basket with the aid of a rope and a bamboo pole to which a net is connected. With the aid of a sharp sickle, mature banana bunches are cut at the stalk end while maintaining a 30 cm length. Manual citrus fruit harvesting and basket collection take place. The ends of grape bunches are cut with scissors. To harvest papaya, twist the fruit until it breaks off. To pick a pineapple, bend it downward until the peduncle separates. A skilled workforce is used to harvest apples, peaches, and plums. Litchi and dates are harvested by their stalks. Beris harvested by shaking the branches.

**Harvesting methods:** Two methods are followed for fruits harvesting. The factors which should be taken into consideration are the perishability of the fruit, economy of labour and market requirements.

**Hand harvesting:** This method of fruit picking is widely used. The harvesting of particularly soft fruits, like strawberries and raspberries, that are borne on little plants is as simple as taking the fruits from the plant and placing them in the appropriate containers. Mango, citrus,

and avocado fruits are challenging to harvest. The fruit is reached by ladder. This process takes a long time. The harvesters feature pick-up platforms that may be lifted and lowered. **Mechanical harvesting:** Only a small portion of the fruit needed for the fresh market is collected by machines since the possible damage could quickly degrade the quality across the marketing chain. Harvesting mechanically is an option for the preparation of the necessary fruits. Strong wind machines that are carried through the orchards can knock oranges off the trees so that they can be collected from the ground and used to extract the juice. Another option is to employ tree shakers, which are fastened to the tree trunk and shake the tree erratically to loosen the fruits. A few days before harvesting, chemical sprays should be sprayed to certain fruits to encourage the development of a natural abscission layer on the fruit stalk. Ethrel, Abscisic acid and cycloheximide are effective chemicals for this purpose. Grapes and soft fruits for processing may be harvested by tractor mounted machines with combing fingers which are run up the stems, pulling of the fruit branches as well as a high proportion of the leaves.

**Handling of fruits:** Mango, banana, papaya, sapota, guava, apple, avocado, apricot, peach, pear, and plum are examples of climacteric fruits that need to be handled carefully. Citrus, grape, berry, pomegranate, litchi, pineapple, and cherries are examples of non-climacteric fruits. Fruit grading should be done on a regular basis. An effective marketing method and improving fruit quality require systematic grading. Because the uniformity of the produce presentation is what is evaluated, grading is a process that is quite crucial. Numerous fruits are graded according to physical features like weight, size, colour, form, and disease-free status, which vary according to agro climatic conditions.

**Grading of fruits is done with different methods as follows:**

- (1) Manual grading
- (2) Partly mechanical and partly manual grading
- (3) Mechanical grading
- (4) Optical methods of grading-colour grading, spectrophotometric techniques, delayed light emission and colour meters.

**The proper grade standards prescribed for each fruit should be followed:** Effective fruit marketing benefits from proper packing, which guards against mechanical harm, moisture loss, theft, and dirt. Cartons made of corrugated fibre board and wood. Today, polynets, jute and plastic bags, and gunny bags are utilised for the packaging of various fruits. Fruits like mangos, bananas, and pineapples are transported in trucks as free loads. Materials used as cushions include paper shavings, dry grass, sawdust, pulp trays, honey-comb partitions, cell packs, etc. Apples and grapes have been successfully stored and transported in corrugated fibre board cartons, which has proven to be effective in minimising spoiling. Fruits are typically transported by headload, bullock cart, trucks, and rail. Perishable fruit is transported all over the world using insulated and refrigerated waggons and trucks. Atmospheric control and in-transit control of levels of oxygen, carbon-dioxide and removal of ethylene and other volatiles from the cargo space could be helpful. Storage losses of fresh produce are high in India due to high temperature and humidity. After harvest, storage at a low temperature slows the rate of respiration, reducing the buildup of respiration heat, thermal degradation, and microbial deterioration. This also aids in the preservation of quality and freshness for a long time. However, the storage life is determined by factors such as variety, maturity stage, infection at harvest, harvest interval, rate of cooling, storage temperature, RH, rate of carbon dioxide accumulation, pre-packing, air distribution system, and storage space use, among others. Fruit storage in a regulated or altered climate is a crucial procedure. It significantly slows down respiratory activity when combined with low temperatures, delaying the softening, senescence, and changes in the quality and colour of the stored fruits.