

INTEGRATED POST HARVEST MANAGEMENT ESSENTIAL FOR REDUCING POST HARVEST LOSSES OF HORTICULTURAL CROPS

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Concept of post harvest food loss reduction

- Nature provides enough food for every living being and it is up to us to sustain the bounties of Nature.
- In the good old days food was available in plenty but a phenomenal increase in population in modern times has resulted in food scarcity.
- Attention to the concept of post harvest food loss reduction as a significant means to increase food availability was drawn by the World Food Conference held in Rome in 1974.
- Food loss prevention became a priority area with the FAO and an Action Programme became operational focusing mainly on durable food grains.
- In May 1980, an Expert Consultation on Food Loss Prevention in Perishable Crops, mainly covering fruit and vegetables was held in Rome.

Importance post harvest management

- The target of National Horticulture Mission (NHM) is to double the production of fruits and vegetables from the existing level of production of 150 million tons to 300 million tons by the end of XI Plan.
- The production of fruits and vegetables will have significance only when they reach the consumer in good condition and at a reasonable price.
- At present there is a considerable gap between the gross production and net availability of fruits & vegetables due to heavy post harvest losses.
- Post harvest management, processing and value addition did not get due attention in most of the previous horticulture development programmes, as a result there was no significant effect on loss reduction.
- On the contrary quantity of losses has increased with the increase in production.
- It is a matter of great satisfaction that under NHM holistic growth of horticulture is linked with post harvest management, processing and marketing.

Present Scenario

- The production of fruit and vegetables during 2005-06 as per the data available with the National Horticulture Board (NHB) is 58.740 and 109.050 million tones respectively.

- Latest information indicates that 30% of all fruits produced, roughly worth Rs.13,600 crore and 30% of the vegetables crops the country produces worth Rs.14,100 crore are lost due to mismanagement.
- According to a joint study conducted earlier by CII and McKenzie, at least 50% of the production of fruits and vegetables in the country is lost due to wastage and value destruction.
- Taking the loss rate at 50% the net availability of fruits and vegetables should be about 84 million tonnes.
- As per the specifications of the National Institute of Nutrition at least 300g of fruit and vegetables are to be consumed by an individual for a balanced diet.
- Thus when the population is one billion, the minimum requirement of fruit and vegetables in the country is 110 million tonnes in order to meet our basic nutrition requirement.
- This figure does not include the requirements of the food processing industry or export. Considering the fact that there is a shortfall of about 26 million tonnes of fruit and vegetables.
- It is evident that the only way to cope with the present situation is to give a massive thrust to post harvest loss reduction in order to make available more food from the existing level of production.

Importance of Fruits and Vegetables in Diet

- Fruit and vegetables in general, except for a few, are not considered to be the primary source of carbohydrate, protein and fat.
- However, some of them with storage roots and tubers are rich in carbohydrate, particularly starch, in amounts comparable to the cereal crops, and can be used as staple food.
- The leguminous vegetables supply as much as 14 per cent protein, dry seeds supplying still more and the lipid content in most vegetables is less than 0.1 per cent.
- Most fruit, vegetables and root crops are rich in minerals, carotene (Pro-vitamin A) and vitamin C. Besides, there are some trace elements required by the body like copper, manganese and zinc, which act as enzyme cofactor. These are found in appreciable quantity in fruit and vegetables.
- The amount of nutrient can vary with the fruit or vegetables, cultural practices, stage of maturity, post-harvest handling and storage conditions.
- Once they are harvested, their composition goes on changing as a result of physiological and biochemical activities, which are natural processes.

Perishable nature of fruits and vegetables:

- Fruit and vegetables are living beings and they carry out transpiration, respiration, ripening and other biochemical activities, which adversely affect the quality.
- In addition, because of their high moisture content fruit and vegetables are inherently liable to deteriorate, especially under tropical conditions, and finally become unmarketable.

- Fruits and vegetables can be preserved in the fresh form by increasing their shelf life or can be processed into different products.
- The shelf life can be increased by storing them in a low temperature room or in controlled atmosphere storage in properly designed packages or wrapping etc.
- The consumption of preserved fruits and vegetables is still low all over the world compared to fresh ones but it is progressively increasing and will continue to do so in view of the seasonal availability of fresh commodities. In most of the developed countries consumption of processed products is relatively high. Processing industries are also beginning to emerge and grow in the less developed parts of the world.

Integrated Post Harvest Management (IPHM) – see (Fig-1)

- The production of fruits and vegetables will have significance only when they reach the consumer in good condition and at a reasonable price.
- At present there is a considerable gap between the gross production and net availability of fruits & vegetables due to heavy post harvest losses.
- The success of production lies in:
 1. Loss reduction,
 2. Prevention of market gluts,
 3. Proper distribution of the produce
 4. Subsequent use by adopting both traditional and modern post harvest technologies,
- 100% utilization of the production in one form or the other should be the motto.
- This can only be achieved by adopting Integrated Post Harvest Management (IPHM) system.

Immediate attention needed

- Harvesting of the produce at proper stage/maturity and applying ideal technique / method.
- Sorting should be accomplished in the farm. This will enable the farmer to have some access to nutrition;
- Packing stations should be established at nodal points to streamline the marketing of fresh horticultural produce.
- By primary processing, the inedible parts can be removed at the packing station before sending to city markets. This will help in reducing city garbage;
- Introduction of corrugated fibre board (CFB) there by paving the way for palletisation and mechanical loading and unloading to promote clean metros
- Establishment of pre-cooling facility by refrigeration/evaporative cooling in our supply chain;
- Improvement of the storage and packaging system by introducing low-cost on-farm techniques based on evaporative cooling to high-tech controlled and modified atmosphere (CA/MA) techniques;
- Encouraging minimally-processed fruits & vegetables as the demand for this is likely to increase;

- Introduction of rapid transportation and improvement in retail outlets. No useful purpose will be served by adopting improved post harvest technology methods unless a proper retail outlet is made since considerable deterioration takes place at the retailers end.
- Value addition by utilizing unmarketable / surplus horticultural produce and processing factory waste;
- Emphasis to processed products from indigenous fruits so that the growers get a remunerative price;
- Promoting bulk freezing, aseptic packaging and mobile processing facility during peak season to bring in price stability.
- Retailing is going through a transition phase in India. Lots of corporates have started making intervention in this area.
- Organized retail marketing of horticultural produce will definitely make a positive impact and improve the socio-economic conditions of small and marginal farmers of India.

Low Cost Appropriate Techniques of Preservation:

- Most of the commercial methods of preservation are expensive and beyond the means of the common people.
- Therefore, it is necessary to adopt low cost methods of preservation so that it can reach the grass root level. In this respect the following techniques are suggested:
 1. Zero energy cool chamber:
 2. Sun/Solar drying
 3. Home/cottage/small scale processing
 4. Lactic fermentation:
 5. Primary/semi/minimal Processing:

Utilization of fruit and vegetable Waste:

- A large amount of unmarketable as well as physically damaged fruit and vegetables that are without infection but would be spoiled on storage can be made into durable and value added products.
- In addition huge quantity of waste generated by fruit and vegetable processing factory could be utilized gainfully otherwise they would be converted into garbage creating environmental pollution.

Price stability of horticultural produce

- Prices of seasonal fruits and vegetables fluctuate greatly and during the period of maximum availability the prices are unremunerative to the farmer.
- At other times, these commodities are so highly priced that the ordinary consumer finds it beyond his purchasing power.

- Another problem is that fruits and vegetables are not uniformly available throughout the country and some areas suffer from inadequate supply even when there is a glut in other parts.
- Integrated Post Harvest Management (IPHM) system would play a vital role in price stability of perishable horticultural produce.

Conclusion:

- It is very difficult to quantify the losses in different regions of the country; however, it may be stated that the losses depend on the post harvest infrastructure facility of the region.
- The losses are more in remote areas compared to places close to cities.
- Post harvest loss has to be gradually cut down by adopting appropriate storage and processing in order to achieve the target of meeting the food and nutritional requirements of the country.
- Every housewife in our country can save a substantial amount of horticultural produce, primarily fruits and vegetables, by adopting simple techniques of preservation.
- In addition to reducing wastage the village women/unemployed youth can be engaged in post harvest management/ processing activities for economic benefit.
- If adequate steps are not taken immediately then there is a danger of increasing the loss with the increase in production.
- Integrated Post Harvest Management (IPHM) will fulfill the objectives set by the National Horticulture Mission (NHM) for the XIth plan
 - i. Post harvest loss reduction
 - ii. Value addition
 - iii. Export orientation
 - iv. Quality improvement
 - v. Strengthening agri-business.
- This will in turn achieve poverty alleviation, employment generation , environment protection and economic transformation of rural India.

Figure - 1

INTEGRATED POST HARVEST MANAGEMENT OF FRUITIS AND VEGETABLES

