

Postharvest Management of Horticultural Crops in Nepal

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Abstract

In Nepal, postharvest loss of horticultural produce is about 15-35%. Losses occur during harvesting, handling, packaging, transportation, storage and retailing. Major causes of postharvest loss are inappropriate harvesting; harvesting at pre-mature and over mature stage; inappropriate handling, packaging, transportation during marketing and storage. Packaging containers are often not scientific and cause damage to the commodities during transportation. Losses during transportations are very high due to compression and vibrational damage. Most of the production areas do not have smooth road, damage to the commodities occur due to jerking during transportation. Moreover, production farms are small and scattered. Collection centers have been established in the production pockets mainly for the vegetables where pack-house operations are not carried out properly. On- tree fruits are often bought by the middle men, which is later harvested and taken to the wholesale market with size based grading but without appropriate packaging. The damage occurred during harvesting are not seen immediately but later visible at destination. A modern packing house is necessary for fruits where pre-cooling, grading and packaging is done. Bulk of production should be enough to run packing house. In case of vegetable a small packhouse may solve the problem. If vegetables are to be exported to other nation they should be handled properly as per international standard. Producers could be organized to produce separately but marketing combined as a cooperative approach. In general cost of production is higher in Nepal compared to India and the products have to compete with Indian produce. Government should formulate policies and develop standard criteria for grading and certification for both domestic and international market. Fumigation or treatment plant is necessary to disinfest certified commodities to meet the international certification requirement. Suggestions have been made in this paper on how to manage horticultural produce in order to reduce postharvest loss, prolong shelf-life and promote marketing.

Keywords: Packing, packhouse, transportation, storage, commercial production

1. Introduction

United Nations Sustainable Development Goal (SDG) 12.3 targets 50% reduction of global postharvest loss and per capita food waste by 2030. SDG recognizes that about one-third of food produced for human consumption is lost or wasted globally, which amounts 1.3 billion tons of food per year worth nearly USD one trillion. In addition it account for about one-fourth of water used in agriculture, total cropland area, total fertilizer use with production of about 3.3 billion tons of CO₂ emissions yearly. In developing countries losses during harvesting and postharvest handling operations of fresh produce is very high, whereas food wastage in consumption level is very high in developed countries. Most of the horticultural produce are perishable in nature and contain about 65-95% water. Postharvest loss of fruits and vegetables reaches up to 40% in developing countries (AVRDC, 2015). In Nepal, estimated postharvest loss of fruits, vegetables and potatoes are 20-35, 15-30 and 15-20%, respectively. Besides quantitative loss there is also decrease in the quality and nutritive value of the products. Reducing postharvest loss and food waste could save money and help to feed additional people with less pressure on climate, water, and land resources. In Nepal, total production of fruits and vegetables is 976,461 and 3,929,034 MT respectively (MOAD, 2016). Assuming that there is 30% postharvest loss exists and if we could reduce it by 50 % we could have saved more than 5,91,000 MT of fruits and vegetables. Various studies have conducted to determine the postharvest loss of fruits and vegetables in Nepal. Postharvest losses have been estimated from 20 to 30% for fresh fruits and vegetables and could exceed 50% under adverse conditions. Losses were reported to vary between 20 and 30% for apple, between 15 and 20% for citrus, between 10 and 15% for tomatoes and between 10 and 15% cauliflower (Adhikari, 2006). Losses in vegetables result from harvesting at an improper stage of maturity, direct packing and shipping without the removal of field heat, improper packaging and insufficient grading and sorting, poor transportation and handling and poor storage facilities. Losses in fruits also result from same conditions as vegetables. Fruits are generally harvested by shaking trees or by hitting with a stick. The fruit consequently drops without the peduncle and leaves. The majority of losses occur during transportation from the farm yard to the collection centers and thereafter to the wholesale market and retail outlets. A study conducted by ANSAB showed postharvest losses of vegetables at different points from farmers' level up to the retailers (ANSAB, 2015). Inadequate postharvest management and certification is the major problem for effective handling and marketing. Government of Nepal has developed agricultural markets and collection centers in different places. Production block, zone and super zones have been declared to promote commercial production of agricultural commodities through Prime Minister Agricultural Modernization Project. Market information has been shared to the farmers through radios and newspapers. There is still lack of enough cooperation among producers, wholesalers and suppliers about what and when to produce, which quantity and what quality to be produced and what to supply to which market. Small farmers in Nepal lack resources and are unable to implement suitable postharvest handling practices and market their produce effectively. Postharvest losses are largely the result of poor organization, improper handling, transportation and packaging, poor storage and weak rural infrastructure. Besides higher loss, higher rate of rejection in market because of poor quality. There should be planning for regular supply of vegetables and fruits to the markets.

2. Approaches and Technologies Used to Reduce the Postharvest Losses in Nepal

Both public and private sectors of Nepal have realized the importance of postharvest technology to satisfy the demand of present population growth and export potential. Furthermore, the cost of minimizing the postharvest losses in fruits and vegetables is lesser than the production cost. At present GO, NGOs, INGOs and private sectors have given due attention in the development and dissemination of postharvest technologies of fruits and vegetables. The Major focuses in reducing the postharvest losses of fresh fruits and vegetables are to develop technologies on appropriate harvesting method, identification of maturity stage using non-invasive technologies, sorting, grading, packaging, transportation and storage. The plastic crates have been found most satisfactory and efficient for the transportation of fresh fruits and vegetables. Various indigenous technologies have been used to make dry and preserved form of fruits and vegetables such as Juice, *Chuk*, *Chaana*, *Achar*, *Amchur*, *Titaura*, *Mada*, *Maseura*, *Gundruk* etc. In recent years, technologies to make dry powder form of vegetables have been introduced. Cellar store and cold store technologies in mandarin and sweet oranges have been prioritized. The farmers of remote hills utilize rustic and cellar stores to store horticulture commodities like potato, cabbage, taro etc.

Suggestions/Recommendations for Planning and Execution

Production in Bulk: Postharvest management involves large investment which ultimately adds to the value of product. Management of small volumes becomes costly. Vegetables could be produced even in small area for domestic supply. Fruits and plantation crops should be produced in larger area in larger volume for management of produce targeted for storage and supply to distant markets. Production of large volume in a particular place may be possible by

A. Proper utilization of pocket areas ex. Block, Zone, Superzone etc

Commercial production is successful if large area for a particular commodity is brought under cultivation. In the small production area it is difficult to manage transportation to long distant market. Small areas are suitable only for the local markets. In the past most of the production pockets could not get momentum as they have small quantity of production which could not make enough bulk for transportation to longer distance. Government of Nepal has already developed pocket areas for specific crops production, production block, zone and super zone. One village one production has been emphasized. Still some coordination is lacking for effectiveness of production.

B. Consolidation of land

It is already mentioned that for commercial production of horticultural crops, large area should be brought under cultivation. In Nepal land is owned by the people and per family holding is small (0.68 ha) and fragmented. All the farmers or people in the same locality may not have same desire to produce designated crop or may keep land fallow. Moreover the lands holding are fragmented and difficult to consolidate. It is necessary to consolidate land by long term lease policy. Government should formulate land lease policy for the commercial production of horticultural crops. Government should categorize land and fix the rent for particular years or government should legalize *Batabara/Adhiya* system by formulating policy and rules or company registration with the sharing of land as a capital or Cooperative production model. It has been observed that most of the suitable lands are fallow as because owners do not produce crops by themselves and do not take risk to give *Adhiya*

or and lease because of uncertainty they may lose the land. Land reform policies of the political parties are just slogan and not applicable and make owners confused.

Establishment of Packhouse: Packing house is a place where harvested commodities are stored till various packing house operations like; pre-cooling, cleaning, sorting, trimming, grading, sizing, dis-infestation, coloring, waxing, chemical treatments, fumigations and packaging are carried out.

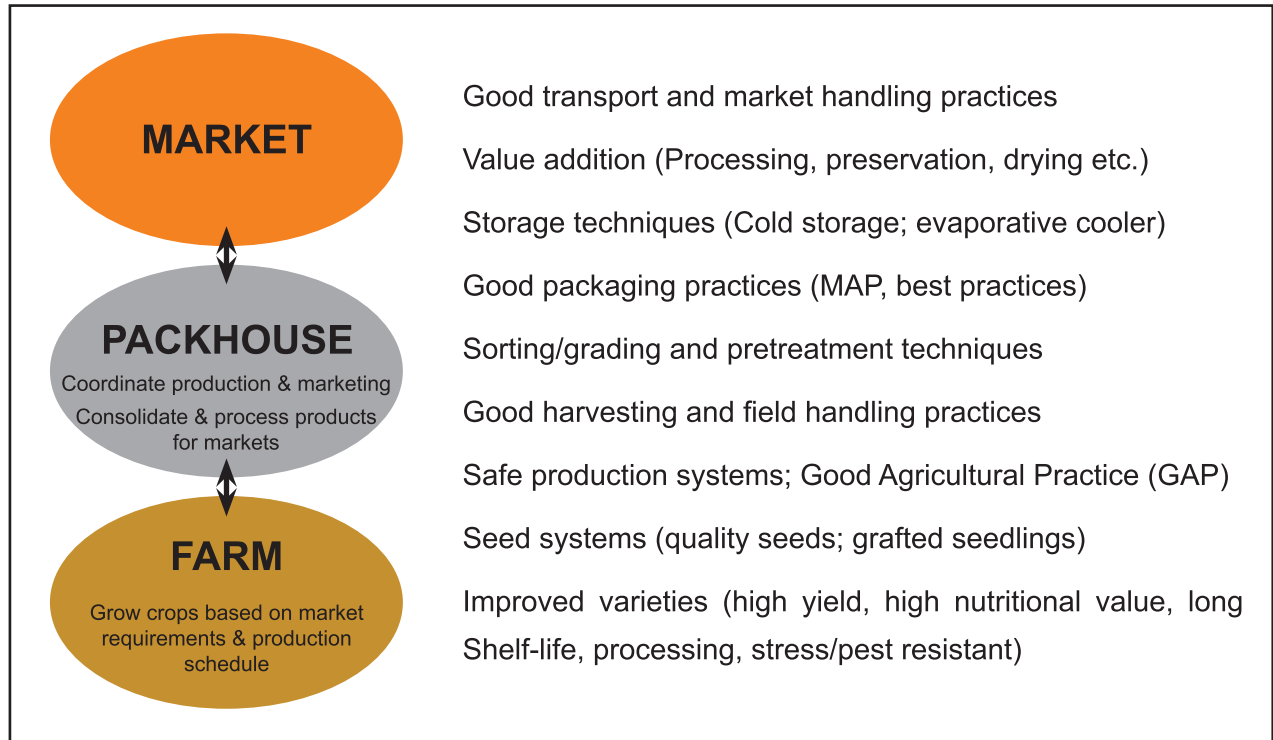


Figure 1: Farm, packhouse, market and different value chain activities

Packing house is more important for fruits rather than vegetables. Establishment of packing house by a small producer is not possible as it requires big investment. The principle of “Produce separately and combine marketing” should be followed in such case. Cooperative organization could be the solution for establishment of such pack-house for small holder farmers. For small vegetable farmers a combined cooperative packhouse can solve the problem. A small packhouse should have sorting, grading, cleaning, cooling, packaging and transportation facilities. AgroManang, a company based at Manang district, has established a large apple production orchard and constructed a model packhouse. There is need to replicate this technology in other areas for other horticultural commodities as well.

For management of packhouse a management team can be formed representing farmers for production, packhouse operation and marketing. Production planning can be arranged according to the market demands (Fig 2).

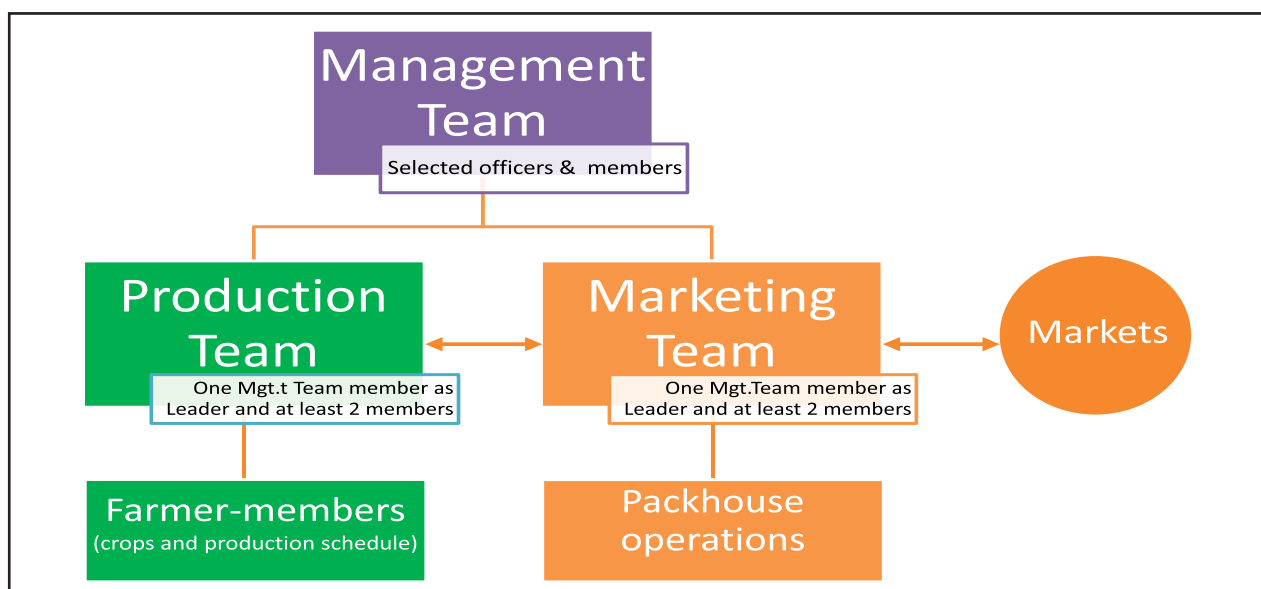


Figure 2: A model of small farmer's managed cooperative packhouse

Source: Acedo.et al., 2016

3. Improvement in Collection Centers

Collection centers have been established in many production areas for the vegetables. These centers are equipped with weighing machine and a shade house for temporary holding of vegetable. These are just collection point where the transporting vehicle comes to get produce. No sorting, grading is practiced in these points. These types of ordinary collection centers are more effective for vegetables that are directly supplied to the market. Fruits are seasonal in nature and are usually stored for regular supply. For fruits ordinary collection center does not work as they need pre-cooling and various packing house operations after cooling. If vegetables are targeted for export market they also need various packing house operations to extend shelf-life and maintain quality.

4. Construction of Storage Structure

Storage structures like cellar storage in the mid-hills for the storage of citrus and rustic storage at higher altitudes for storing potatoes have been developed in the past. Both types of storages are small without artificial control of temperature and humidity and applicable to store small quantities of commodities. At present there are more than 51 cold storages across the country. Most of these cold storages are single chamber and are used to store potatoes. Very recently a few cold storages have been developed for storing fruits. Large scale production of fruits in commercial scale should be supported by cold storage as they are perishable and cannot be marketed immediately.

5. Provision of Refrigerated Vehicle for Transport

In the developed countries fruits after pre-cooling are stored or transported in refrigerated vehicles to minimize the rate of respiration and transpiration. Cold storages at the production centers and destination without refrigerated transport are not justifiable. Special refrigerated vehicle should be arranged for the transportation of fresh fruits and other horticultural produce which need to be stored or transported to distant markets or used for processing.

6. Development of Marketing Structures

Whole sale markets for horticultural commodities should be furnished with cold storage. Being perishable in nature postharvest loss in ordinary conditions is high in fresh product. So far market structures made/constructed in different locations in the country are temporary dumping site for transactions and have no cold storage, processing, treatment facilities and other facilities are available.

7. Establishment of Processing Industries

Not all the fruit crops produced are superior in quality. In general, qualities of fruits fall as super grade, moderate and low grade. High quality of fruits can be marketed easily, while it is difficult to sell low grade and higher quantity of fruits damage occur during storage. In the production seasons fruits are glut in the market with lower price. Processing is necessary for value addition, to utilize over production, to utilize low grade production and to utilize damaged fruits. Therefore, fruit processing industries including distilleries should be encouraged. Further, coffee is one of the most potential crops in mid hills to earn foreign money hence, a modern processing industry should be established to promote processed coffee product.

Besides these, there should be provision of crop insurance, soft loan, subsidies, development of road, and provision for export, supply of quality inputs, market information system, development of institution of guidelines for quality certification and skilled manpower development on postharvest technologies. All these above points play important role directly and indirectly in effective postharvest management of horticultural produce. Until and unless large area is brought under production postharvest management is difficult and becomes costly to meet the international standard.

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