1st lecture **Postharvest Technology**

Introduction

The need to increase food production to meet the requirements of a rapidly growing world population is widely recognized. Cereals, pulses, fruits, and vegetables are the important food crops in the world as these are the bulk sources of calories, proteins, and nutrients, and spices and plantation crops play an important role in the economies of many countries. To supply an adequate quantity of grains and other food to the expanding world population is a challenge to mankind. Rice and wheat have an added importance in national and international trade with political and social implications.

One of the sources of food insecurity is post- harvest crop loss. In Kurdistan countries pre and post-harvest crop losses are higher than the global average. It has been estimated that at least 10 percent of the continent s crop productivity is lost on and off farm. This is mainly **because most subsistence farming communities to do not have access to appropriate technologies.** A wide range of existing food processing technologies is not accessible to and adapted and their communities. Climatic conditions also contribute to crop losses. Floods, heavy rains, droughts and other related factors cause considerable post -harvest crop loss.

What is Post-Harvest Technology?

Post-harvest technologies constitute an inter-disciplinary science and techniques applied to agricultural commodities after harvest for the purpose of preservation, conservation, quality control/enhancement, processing, packaging, storage, distribution, marketing, and utilization to meet the crop and nutritional requirements of consumers in relation to their needs.

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The horticultural produce includes fruits, vegetables, flowers and other ornamental plants, aromatic and medicinal plants and spices. Fresh fruits, vegetables are highly perishable because they are alive. Release heat from respiration, and, consequently, lose moisture, which may detract from their appearance, salable weight, and nutritional quality. They can become sick, deteriorate, and die. Dead fresh fruits and vegetables are not marketable!

Losses in quantity and quality affect horticultural crops between harvest and consumption. The magnitude of postharvest losses in fresh fruits and vegetables is an estimated **5 to 25** percent in developed countries and **20 to 50** percent in developing countries, depending upon the commodity **because of** :

•Lack of reliable maturity indices for farmers.

•Poor produce handling.

•Poor transportation and transport without packaging.

•Inappropriate packaging which does not protect the crops.

- •Poor temperature and humidity control around the crops.
- •Lack of appropriate post-harvest treatments.
- •Unsuitable use of pesticides.
- •Low prices on the local market which discourage the use of expensive packaging and transport.

To reduce these losses, producers and handlers must understand the biological and environmental factors involved in deterioration and use postharvest techniques that delay senescence and maintain the best possible quality.

The purpose of postharvest technology is to maintain or enhance quality of the products and make it readily marketable.

"**Post-harvest**" start at the moment of separation of the edible commodity from the plant. The post-harvest period ends when the crop comes into the consumer.



"Loss" means any change in the availability, edibility, or quality of the crops that prevents it from being consumed by people.

Post-harvest losses

Effect on.....

- 1- Quantity
- 2- Quality
- 3- Value

Quality is defined as "any of the features that make something what it is" or "the degree of excellence or superiority". The word quality is used in various ways in reference to fresh fruit and vegetable crops **such as** market quality, edible quality, dessert quality, shipping quality, nutritional quality, internal quality and visual quality.

Safety factors include levels of naturally occurring **toxicants** in certain crops (such as glycoalkaloids in potatoes) that vary according to genotypes and are routinely monitored by plant breeders to ensure that they do not exceed their safe levels in new cultivars.

Contaminants, such as chemical residues and heavy metals, on fresh fruits and vegetables ,the harvesting and postharvest handling operations are essential to minimizing microbial contamination. Proper preharvest and postharvest handling

procedures must be enforced to reduce the potential for growth and development of mycotoxin-producing fungi.

All fresh horticultural crops have variable shelf life and require different suitable conditions during marketing; **they are high in water content** and are subjected to desiccation (wilting) and **to mechanical injury**. Fruit and vegetable is highly perishable but most important commodity for human due to their **high nutritional value**, **cheapest** and other **source of protective food**.

Horticultural produce is alive and has to stay alive long after harvest. Like other living material it uses up oxygen and gives out carbon dioxide. It also means that it has to receive intensive care.

Technical knowledge needed for successful postharvest handling of fruit and vegetable spans many disciplines - chemistry, physiology, biochemistry, pathology, entomology, engineering and molecular biology.

The main objectives of applying postharvest technology are:

- 1. To maintain quality (appearance, texture, flavor and nutritive value).
- 2. To increase the shelf life of fruit and vegetables.
- 3. Fruit and vegetable are available in surplus only in certain seasons and availability in different regions. To make the seasonal fruits available throughout the year for storing seeds, such as potatoes and seeds.
- 4. To facilitate the shipment of fruit for long distances.
- 5. To protect food safety.
- 6.To reduce losses between harvest and consumption.

7.To organize the display fruit in the market. To stabilize the prices of the fruit and vegetables in the market.

Postharvest losses can be classified as:

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- a) **Direct losses** i.e. those caused by waste or consumption by non-human agents, such as insects, birds, fungi, bacteria and others.
- **b) Indirect losses** i.e. those due to deterioration in quality or acceptability of the product up to the point of complete rejection by the consumer, eg.changes in its appearance texture, and color caused by climate, improper handling, transportation, or infrastructure.
- c) Economic losses i.e. those losses brought about by changes in market
 conditions and expressed in economic terms, eg. Losses due to changes in demand and supply.

Important sites of post-harvest losses: Important sites where post-harvest losses are

noticed in: Farmer's field Packaging Transportation Marketing