Definition; Importance of Horticulture and Divisions of Horticulture.
What is Horticulture?

- Horticulture consists of two parts, viz.
  - *Hortus* meaning garden and
  - *Colere* meaning to grow or to cultivate (Cultura meaning cultivation).
The word horticulture - first conceived by Peter Laurenberg.

In English language the word horticulture - used for the first time in 1678 in a book entitled “New World of Words” by Phillips.
Garden - a broad term.

Garden - originated from the latin term Gyrdan meaning ‘to enclose’.

When fruits are grown in a definite area then that part is called as an Orchard.
Hence, horticulture is that branch of Agriculture which concerns with the garden crops.

Horticulture can also be defined as the branch of agriculture concerned with intensively cultivated plants directly used by man for food, for medicinal purposes or for aesthetic purposes.
Main distinguishing features of horticulture

- Horticulture crops are used in a living state while others like grains etc. are not used in a living state.
- Horticulture crops are comparatively more intensively cultivated than field crops.
- Horticulture crops have high water content and are highly perishable.
- Cultural operations like propagation, training, pruning and harvesting are skilled and specific to horticultural crops.
- Horticultural produce are rich source of vitamins and minerals and alkaloids.
DIVISIONS OF HORTICULTURE

- Production of edible fruit crops --- Pomology
  \[pomum = \text{fruits}, \ logy = \text{science},\]

- Production of vegetable crops --- Olericulture
  \[oleris = \text{pot herb}\]

- Production of ornamental crops --- Floriculture and Landscaping

- Preservation of horticulture produce for consumption --- Fruit Technology
Pomology

- Pomology: is a branch of horticulture which deals with various aspects of fruits starting from rising of saplings, growing them properly and providing various intercultural operations, the term pomology is a combination of two Latin words pome-fruits and logos-culture. "Poma" in Greek means fruits later subsequently transfer into "Pome" in Latin word means fruits, logos- study.
Olericulture

- Olericulture: refers to cultivation of vegetables.
Floriculture And Landscaping

• **Floriculture**: is a branch of Horticulture which deals with commercial growing, marketing and arranging flowers and ornamental plants, which includes annuals, biennials and perennials viz., trees, shrubs, climbers and herbaceous perennials.

• **Landscaping**: is the design and alternation of a portion of land by use of planting material and land reconstructions.
Post Harvest Technology

• It deals with post harvest handling, grading, packaging, storage, processing, value addition, marketing etc. of horticulture crops.
History of fruit cultivation is as old as civilization.

Fruits have their references in Vedas, Purans, Upnishads etc.

Oldest fruit is said to be Date palm as its reference dates back to 7000 B.C., next is Pomegranate (3500 B.C), Grapes (2440 B.C), Mangoes, Banana and Coconut (2000 B.C), Peach and Almond (1300 B.C), Olive (100 B.C).

First book exclusively on litchi cultivation was published in China in 1056 A.D.
• In India, commercial horticulture - recent origin (100 years old).
• Orchards in olden days - planted just for hobby by the kings.
  • Akbar planted >1 lakh plants of fruit trees - at Dharbanga (in Bihar) – named as Lakhbagh - referred in a book called Ain –e – Akbari.
  Mughals - established Mughal gardens.
• In H. P. Major Bannon and Captain Lee - first to plant the apple orchard in Kullu valley.
• Sir Alexander Coutts - an apple orchard at Mashobra.
• S.N. Stokes - apple growing in Kotgarh.
Origins of Horticultural Science

• The origin of horticultural science derives from a coming together of three events:
  - the formation of scientific societies in the 17th century,
  - the creation of agricultural and horticultural societies in the 18th century, and
  - the establishment of state-supported agricultural research in the 19th century in different countries.

• In England Two seminal horticultural societies involved:
  - The Horticultural Society of London (later the Royal Horticulture Society) founded in 1804 and
  - The Society for Horticultural Science (later the American Society for Horticultural Science) founded in 1903.
IMPORTANCE OF HORTICULTURE

- Diet
- Entertainment
- Medicinal purposes
- Environment
- Aesthetic value
- Economic value
Importance of fruits in human diet

• From human nutrition point of view, horticulture is most important to our daily living. Many of the horticulture crops and their products find place in our meals and diet.

• Human body requires vitamins, minerals, proteins, energy etc. for its health. All these are supplied by horticultural crops. Fruits and vegetables are the chief sources of vitamins, minerals, carbohydrates, fats, proteins etc. are recognized as protective foods as they are necessary for the maintenance of human health.

• A person should consume at least 120 g of fruits per day as per Indian Council of Medical Research, but the consumption of fruits per capita in India is still low. However, the availability of fruit is 172 g per day in our country. In countries like Italy, France and USA, the consumption is 308, 232 and 223 g / day respectively.

• Deficiency of any minerals and nutrients is depicted by the human body by giving typical symptoms. The great majority of people obtain most of their carbohydrates and proteins from cereals and pulses but their diets must also contain significant amount of fruits to ensure that they get the vitamins which are not provided by the staple cereal foods.
Vitamins

• These are the important constituents of fruits and vegetables and are indispensable part of human diet.

• Although required in very minute quantities, they are absolutely essential for the maintenance of health.

• The deficiency of any vitamin from the diet for considerable period may lead to diseased state or disorder conditions.

• Fruits and vegetables supply several vitamins.
Vitamin-A

- It is essential for normal growth, reproduction and maintenance of health and vigour.
- It affords protection against cold and influenza and prevents night blindness.
- Its deficiency results in
  - cessation of growth in young children, night blindness, drying up of tear glands in the eyes, eruption of skin (Rashes on the skin) and brittleness of the teeth

**Sources:** Mango, Papaya, Dates, Jackfruit, Walnut etc.
Vitamin B1 (Thiamine)

• Tones the nervous system and helps in proper functioning of the digestive tract.

• Its deficiency in human diet results in —
  – Beri-beri, paralysis, loss of sensitivity of skin, enlargement of heart, loss of appetite, loss of weight and fall in body temperature.

• Sources: Orange, pineapple, jack fruit, cashew nut, walnut, dry apricot, almond, banana etc.
**Vitamin B2 (Riboflavin):**

- Required for body growth and health of the skin.
- Its deficiency causes
  - sore throat, anorexia, cataract, and loss of appetite and body weight and also development of swollen nose.
- **Sources:** Bael, papaya, litchi, banana, apricot, pomegranate, pear etc.
Vitamin B6 (Pyridoxin)

- Its deficiency causes
  - dermatitis, anemia, ulceration in oral cavity etc.
- Rich fruits are chestnut, walnut, almond, apricot, apple, plum etc.

Niacin

- Its absence causes
  - sour tongue, Pellagra (a complex of diarrhea, loss of mental aptitude, and dermatitis), discoloration of skin of hands, feet and legs and under severe condition the mental balance may shift.
- Rich fruits are chestnut, walnut, almond, apricot, apple, plum etc.
Vitamin -C (Ascorbic Acid):

- This vitamin promotes general health and healthy gums,
- Prevents scurvy disease which is characterized by pain in the joints and swelling of limbs (rheumatism), bleeding of gums, tooth decay and keeps the blood vessels in good condition.
- **Sources:** Amla, guava, ber, citrus, strawberry, pineapple etc.
<table>
<thead>
<tr>
<th>Constituent</th>
<th>Sources</th>
<th>Established or proposed effects on human wellness</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vitamin K</td>
<td>Nuts</td>
<td>synthesis of pro-coagulant factors, osteoporosis</td>
</tr>
<tr>
<td>Vitamin E (tocopherols)</td>
<td>Almonds, cashew nuts, filberts, macadamias, pecans, pistachios, and walnuts</td>
<td>heart-disease, LDL oxidation, immune-system, diabetes, cancer</td>
</tr>
<tr>
<td>Fiber</td>
<td>most fresh fruits and vegetables, nuts, cooked dry beans and peas</td>
<td>diabetes, heart disease</td>
</tr>
<tr>
<td>Folate (folicin or folic acid)</td>
<td>dark-green leafy vegetables (such as spinach, mustard greens, butterhead lettuce, broccoli, brussels sprouts, and okra), legumes (cooked dry beans, lentils, chickpeas and green peas),</td>
<td>birth defects, cancer heart disease, nervous system</td>
</tr>
<tr>
<td>Calcium</td>
<td>Papaya, raisins, orange, almonds</td>
<td>osteoporosis, muscular/skeletal, teeth, blood pressure</td>
</tr>
<tr>
<td>Magnesium</td>
<td>Banana, nuts, cashews</td>
<td>osteoporosis, nervous system, teeth, immune system</td>
</tr>
<tr>
<td>Potassium</td>
<td>Dried fruits (such as apricots and prunes)</td>
<td>hypertension (blood pressure) stroke arteriosclerosis</td>
</tr>
</tbody>
</table>
Economic Importance

i) Increased production possible in comparison to other Agronomical crops because trees have a longer life and their production increases with advancement in age provided a proper care is taken. Similarly vegetables can also be grown 3 to 4 times each year giving the products all the time they are grown. More number of crops can be grown from same piece of land.

ii) More profitable since the average income per unit area is more in horticulture crops than agriculture crops e.g.

<table>
<thead>
<tr>
<th>Fruits</th>
<th>Income (in Rs) / year / hectare</th>
</tr>
</thead>
<tbody>
<tr>
<td>Grape</td>
<td>62000- 63000</td>
</tr>
<tr>
<td>Papaya- fruit</td>
<td>20000</td>
</tr>
<tr>
<td>- papain</td>
<td>40000- 50000</td>
</tr>
<tr>
<td>Aonla</td>
<td>20000</td>
</tr>
</tbody>
</table>
iii) With the support of horticulture, many agro – industries can spring up in villages itself. It is an acceptable fact that horticulture can come in a big way to solve the problem of unemployment. Source of other industries e.g. rubber, oil, gum, dyes, chemicals etc. raw material for fruit and vegetable-processing plants, hence becomes a solution to reduce unemployment.

iv) Employment is also generated in doing field operations like fruit picking / harvesting, grading, packing, selling etc. In cereals labor engagement is of 143 days and in fruits it is of 850 days ( in intensively grown fruits like grapes, banana and pineapple it is 1000 to 2500 man-days).
• Dependence on cereals can be decreased since the fruits and vegetables provide almost every nutrient and mineral required for the human body as the food.

• Foreign exchange can be earned by exporting the fruits and vegetables and their quality products e.g. mango, almond, saffron etc. (export of fruit is > 52% of total agriculture production). Products like jams, jelly, pickles etc. are exported and similarly making them indigenously thus saving the foreign exchange minimizes the import of wines and other horticulture-based products.
Areas related to horticulture for providing employment

- Fruit cultivation
- Vegetable cultivation
- Plantation and spice crop cultivation
- Vegetable F1 seed production
- Vegetable and flower seed production for export
- Cut flower production and floriculture
- Landscaping
- Nursery raising
- Tissue culture
- Marketing
- Processing of horticulture produce
- Government development departments
- Ancillary services (fertilizers, tools, insecticides –pesticides, irrigation equipments, chemicals like growth regulators etc. –manufacture, sale essence and consultancy services)
- Research and education
Entertainment

Roaming in the gardens, orchards or places well planted with flowerbeds etc. gives mental piece to the persons. One enjoys fresh air and natural beauty, sheds of tension making him fresh.

Medicines

• The parts like stem, leaf, flowers, roots and even the fruits of horticulture plants are used to make drugs, chemicals, insecticides, germicides etc. e.g. rose water is used to cure eyes ailments. Similarly saffron is important ingredient of many medicines.

• Papain is a digestive enzyme, citrus fruit like sweet lime is used for liver ailment, rind of pomegranate and pectin from guava used for stomach upset, bark of arjun trees for heart troubles, neem water for skin irritation and allergies etc.
Aesthetic value and religious importance

- Aesthetic value and religious importance is the unique factor distinguishing it from agricultural activities.
- Mango leaves, wood, banana leaves etc. are used for religious functions.
- Similarly the plantation of banana tree in the court yard or tulsi plantation is said to bring prosperity as per Hindu religion.
- This aspect of horticulture has lead to its universal popularity.
- Paradise means garden. The hanging garden of Babylon (one of the 7th wonders of the world) and the Versailles garden of 17th century are unique examples.
SCOPE OF HORTICULTURE

• The importance of horticulture in improving the productivity of land, generating employment, improving economic conditions of the farmers and entrepreneurs, enhancing exports and, above all, providing nutritional security to the people, is now widely acknowledged.

• Presently, the horticulture sector contributes around 31% of the GDP and 38% of the total exports of agricultural commodities from around 14% of area.
  ➢ India is the 2nd largest producer in the world, with 81.28 million tones of fruits occupying an area of 6.98 million hectare
  ➢ Area under fruits in the state is 2,20706 ha with production of 8,66,344 MT.
  ➢ Himachal is predominately horticultural state which is bestowed with unique potentialities of growing temperate and sub-tropical fruits.
  ➢ Economy of the farmers depends upon cultivation of fruits and vegetables.
In our country

• Per capita per day consumption of fruits in our country is the lowest (120 g) in comparison to developed countries (250 –400 g) and even the developing countries (100 –200 g) like Philippines, Pakistan etc.

• Requirement of fruit is sure to increase with the growing urbanization and awareness regarding the need of fruits in the day to day diet.

• Fruit cultivation is labor intensive industry and is well suited for over populated nations like India and China. Fruit production involves specialized skills like production, harvesting, marketing, canning, processing and many other connected trades; hence, it can accommodate a huge manpower.

• Horticulture has the highest potential of export. The International trading in fruits increased by 20% annually. With the production of quality fruits and implementation of improved technologies, the export of fruits can be increased manifolds and many more countries will become the importers of Indian fruits. -
LIMITATION / PROBLEMS OF FRUIT PRODUCTION

1. High initial investment :-
   
a) The initial investment on new orchard is very high e. g. cost of land, layout, digging of pit, cost of plants and planting, cost of fertilizers, F.Y.M, insecticides, pesticides etc.
   
b) In plants requiring special system of pruning and training e. g. in Kiwi, Grapes etc. the initial cost further increases because of investment on erecting special training structures.

   Therefore, every person cannot afford to take up fruit production as an enterprise.
2. Non-availability of quality planting material:

Adequate availability of quality plants is essential for orchard establishment.

Lack of knowledge in procuring quality plants can result in disastrous results. No proper legislation is enforced to curb sale of inferior plants through footpath sellers or by private nurseries resulting in the dissemination of the inferior plants to growers in most of the cases.

Citrus plants are very often infected with citrus canker, leaf minor, similarly mango plants with malformation, peach with leaf curl and nematodes etc.
3. Long juvenile period :-

Most of the fruit crops have a long juvenile period and thus bear their first crop after a good many years e.g. stone fruits take 4 to 5 years, pecan nuts 10 to 12 years etc.

Orchardist, hence, has to bear the cost of maintaining the plants through some other sources for such number of years.

Though practice of planting fillers is being adopted for substantiating the income till the main crop comes into bearing.
4. Perishable nature :-

Horticulture plants have high water content, hence, are of perishable nature.

The technologies for increasing the shelf life are lacking and more over the facilities for providing the cold store are quite scarce in number.

This causes the over flooding of the fruits in market during the peak-harvesting season, resulting in the crash in the prices of the commodity.
5. Lack of processing unit :-

Very limited scale processing industries are available in our country.

The fruits growing in abundance e.g. mango, banana, citrus, pineapple etc. could otherwise give higher returns if processed in different products and exported.

6. Lack of proper storage and transportation facilities :-

This results in the loss of 15% in most of the fruit crops. Our country still lacks the fleet of refrigerated railway carriages, which is the most suitable and smooth way of transportation of fruits.
7. Faulty marketing system :-

Most of the profits (upto 65%) is taken away by middlemen the fruit mandis where the grower is basically compelled to sell the fruit.

From the grower the fruit passes through the hands of big contractor to small contractor, commission agent, whole saler, retailer before reaching the consumer. Thus the grower gets a margin of the profits only.

8. Low purchasing power :-

Irrespective of the low pricing of the fruit during the glut, it still remains out of reach of the common man who constitute most of our country’s population.
## Export of fruits and fruit products

<table>
<thead>
<tr>
<th>Fruit</th>
<th>Destinations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Apple</td>
<td>Bangladesh, Sri Lanka, Saudi Arabia</td>
</tr>
<tr>
<td>Banana</td>
<td>Nepal, Netherlands, Qatar, Russia, Saudi Arabia, Bahrain</td>
</tr>
<tr>
<td>Grapes</td>
<td>Bangladesh, Saudi Arabia, Bahrain, U.A.E, Kuwait, Oman, European countries</td>
</tr>
<tr>
<td>Guava and Litchi</td>
<td>Netherlands, Russia, Saudi Arabia, U.A.E, Lebanon, Yemen, Canada</td>
</tr>
<tr>
<td>Mango–dried slices</td>
<td>U.K, Hong Kong, Bangladesh, Kuwait, Canada</td>
</tr>
<tr>
<td>Mango – puree and paste</td>
<td>Saudi Arabia, Russia, Netherlands, and Nigeria</td>
</tr>
<tr>
<td>Mango – squash</td>
<td>U.S.A and Canada</td>
</tr>
<tr>
<td>Pineapple</td>
<td>Nepal, Saudi Arabia, U.A.E, Kuwait and European countries</td>
</tr>
</tbody>
</table>