

FREE E-BOOK



PLANTATION AND HORTICULTURE

**Agriculture & Rural Development
(ARD) Notes**



FOR NABARD GRADE A EXAM

Plantation & Horticulture

ARD Notes for NABARD Gr. A Exam

What is Plantation Agriculture?

Plantation agriculture is a type of commercial farming. It mainly focuses on commercial crops from where we get a good amount of profit, and this farming can be done in all the seasons.

Introduction: Plantation Agriculture

Plantation agriculture is a type of commercial farming in which a single crop is grown for the entire year. The crop production may be further processed on the farm itself where it is grown or in nearby factories or small-scale industries. A transport network is essential.

Major crops grown: Tea, coffee, sugarcane, cashew, rubber, banana, or cotton.

- Major plantations are found in the tropical regions of the world.
- Rubber in Malaysia,
- Coffee in Brazil,
- Tea in India and Sri Lanka

Characteristic of Plantation Agriculture are:

- Scientific methods of cultivation.
- Labour intensive and capital intensive.
- Crops are mainly grown for market.
- Large capital investment
- Single crop farming on a large area.
- Rapid transportation which links the estates to the factories and markets.
- Managerial and technical support.

Agronomy:

It is a science of looking at the cultivation of crops in a holistic manner.

Horticulture:

This branch out into different categories such as cultivation of flowers, cultivation of ornamental plants, growing of fruits, vegetables construction of gardens and public parks, and so on.

Horticulture vs Agronomy

- Agronomy is a science of looking at the cultivation of crops in a holistic manner.
- It includes all practices that improve the yield and quality of crops conserving the environment and the quality of the soil.
- Horticulture is the practice of growing ornamental plants, fruits, and vegetables on many different scales from gardens in homes and huge fields for MNC's.

Horticulture is Divided as:

- The cultivation of plants for food (pomology and olericulture) and
- Plants for ornament (floriculture and landscape horticulture)
- Pomology deals in fruit and nut crops.
- Olericulture deals in herbaceous plants for the kitchen, like carrots (edible root), cauliflower (edible flower buds), tomatoes (edible fruit), and peas (edible seed).
- Ornamental plants deal in cut flowers, pot plants.
- Landscape horticulture deals in nursery crops (shrubs, trees).
- Bulb crops- include plants the tulip, hyacinth, narcissus, iris, daylily, and dahlia.
- Floriculture, a branch of ornamental horticulture concerned with growing and marketing flowers and ornamental plants as well as with flower arrangement. floriculture is largely thought of as a greenhouse industry.
- Tulip cultivation in the Bulbland, north of Leiden, Zuid-Holland province, Neth. It is the application of science to horticulture.

Factors Influencing while Plantation in Horticulture: -

- Temperate zones Including those areas where frost in winter occurs.
- In Northern Hemisphere - Parts of Europe, North America, and northern Asia, United States (southern Florida), the north coast of the Mediterranean and the Mediterranean islands.
- Southern Hemisphere - New Zealand, some parts in Australia, and the southern part of South America.

- Slopes of great mountain ranges - the Himalayas and the Andes,
- The great coniferous and deciduous forests: pine, spruce deciduous oaks, ash, birch, and linden.
- Cereal crops- wheat, barley, corn (maize).
- World-famous gardens - rose gardens, woodland gardens, and rock gardens.

Tropical Zones

It requires annual distribution of rainfall. The zone between the Tropic of Cancer and the Tropic of Capricorn

Eg. The high slopes of Mount Meru (Africa) near the Equator.

Vegetable grown - sweet potatoes, kinds of French bean, pigeon pea, the soybean, the peanut (groundnut). Miscellaneous crops include watercress, ginger, lotus, and bamboo.

Propagation

Propagation can be achieved sexually by seed or asexually by utilizing specialized vegetative structures of the plant techniques as cutting, layering, grafting, and tissue culture

The most common method in self-pollinated plants is done by seeds.

Two disadvantages of seed propagation:

1. Genetic variation occurs in seeds from cross-pollinated plants
2. Some plants take a long time to grow from seed to maturity. Eg. Potatoes.

Vegetative Propagation:

It is an asexual method of plant reproduction that occurs in its leaves, roots, and stem. This can occur through fragmentation and regeneration of specific vegetative parts of plants.

Types of Vegetative Propagation

1. **Natural Vegetative Propagation:** This occurs when plants grow and develop naturally without any human interference. Thus, new plants may emerge from the roots, stem and leaves of the parent plant.
2. **Artificial Vegetative Propagation:** This is a type of vegetative reproduction carried out by humans in the fields and laboratories.

Types of artificially vegetative reproduction occurring:

- i. **Cutting** - A stem or leaf is cut and planted in the soil.
- ii. **Grafting** - The cutting from some other plant is attached to the stem of the plant rooted in the ground.
- iii. **Layering** - The stem of the plant is bent to the ground and covered with soil. This attached stem with developing roots is known as a layer.
- iv. **Tissue Culture** - The plant cells from different parts of a plant are cultured in the laboratory to develop a new plant. This technique is helpful in increasing the number of rare and endangered plant species that are unable to grow under natural conditions.

Breeding

Plant breeding, the systematic improvement of plants through the application of genetic principles, has placed the improvement of horticultural plants on a scientific basis.

The goal of the plant breeder - superior crop

Environmental Control: Heat that builds up in the cold frame during the day aids in warming the soil, which releases its heat gradually at night to warm the plants.



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Hotbeds: When supplemental heat is provided, the structures are called hotbeds. Greenhouses are large hotbeds. Today, heat is provided by electric cables, steam, or hot-water pipes buried in the soil. Other environmental factors are controlled through automatic watering, regulation of light and shade, the addition of carbon dioxide.

Temperature Control: including the application of hot caps, cloches, plastic tunnels, and mulches of various types.

Mulching Domestic Gardens: the various benefits of economical plant feeding, conservation of moisture, and control of weeds and erosion.

The temperature (called common storage): The regulation of oxygen and carbon dioxide levels along with the regulation of temperature is known as controlled-atmosphere storage. Eg. ripening can be induced with the application of ethylene gas.

Frost Control: Frost-control methods involve either reduction of radiational heat loss or conservation or addition of heat. Radiational heat loss may be reduced by hot caps, cold frames, or mulches sprinkler irrigation.

Light Control: Light provides energy for photosynthesis, light affects such processes as dormancy, flowering, tuberization, and seed-stalk development.; the recurrent cycle of light is known as the photoperiod.

Soil Management: Crop rotation is planned to ensure that the soil is not depleted of essential chemicals by repeated use of one type of plant in the same plot. Fertilizers are applied in a precise routine

Water Management

Number of methods of land irrigation.

1. **Surface irrigation:** Water is distributed over the surface of the soil.
2. **Sprinkler irrigation:** Application of water under pressure as simulated rain.
3. **Sub-irrigation:** Distribution of water to the soil below the surface; it provides moisture to crops by upward capillary action.
4. **Trickle Irrigation:** Involves the slow release of water to each plant through small plastic tubes, (adapted both to the field and to greenhouse conditions.)

Removal of excess water from soils can be achieved by:

1. **Surface Drainage:** Removal of surface water by the development of the slope of the land utilizing systems of drains to carry away the surplus water.
2. **Subsurface Drainage:** Open ditches and tile fields intercept groundwater and carry it off.

Pest Control

Plant pests include viruses, bacteria, fungi, parasitic plants, weeds, nematodes, insects, mites, birds, and rodents.

Control of pests is achieved by the pathogens.

Classified as: Cultural, physical, chemical, or biological.

1. **Cultural Practice:** Reduce effective pest population elimination of diseased or seeds (roguing), cutting out (surgery), removal of plant debris (sanitation).
2. **Physical Methods:** To eliminate the pest entirely (a common practice in Japan). Heat treatment is used to destroy seed-borne pathogens in greenhouses to eliminate soil pests such as fungi, nematodes, and weed seeds.
3. **Chemical Control:** Use of organic methods in commercial horticulture is limited. Eg bactericide, fungicide, nematicide, miticide, insecticide, rodenticide, and herbicide.
4. **Natural parasites (biological control)**

Different Technologies for Sustainable Crops: Horticulture

1. **Automation for Plant Monitoring:** It allows the farmer to make timely decisions and take preventative measures. It saves time and money.
2. **Use of Drones for Pest and Disease Identification and Management:** This technology identifies pest and disease 'hotspots' in crops and then accurately disperse beneficial insects from the air
3. **Alternatives to Traditional Growth in Soil:** This technique is revolutionising the demand for natural resources for water and land.
4. **Symbiotic Organisms and Plant Defences:** This research focuses on plant growth and can be applied from the start of the cultivation cycle. Biopesticides come in this category.

Biopesticides provide a wide range of tools for non-chemical pest and disease control but are tightly regulated.

There are three categories of microbial biopesticides:

- i. Bacteria
- ii. Fungi, and
- iii. even viruses.

5. Precision Agriculture for Weed Control, Soil Health and Better Yields: to produce more food in a sustainable manner. There are two examples:

1. The blue river technology (a precision weed control machine)
2. Soil health and pepper yield on a farm with salinity issues

Post-Harvest Management:

Horticulture

1. The prime aim is to generate improved value for farmers,
2. With a choice of markets, across larger geographies and by reducing losses in the supply chain

India is the country that ranks second in the production of fruits and vegetables in the world after China, A resultant demand-supply mismatch for perishable products, which contributes to fluctuations and inflation.

Developing measures taken in “post-harvest management for horticultural”

Aims:

1. Reduce food loss
2. Ensure nutritional security
3. Reduce inflation
4. Meet our sustainable development goals.
5. Production become market linked
6. Lack of railways, vehicles and waterways modes makes the efforts redundant.

Present Status

The government has launched a unified market mechanism in form of the e-NAM. This is a physical movement and trade of all agricultural produce.

Government Schemes and Incentive

The mission for Integrated Development of Horticulture Promotes fresh whole food supply chain (agricultural produce) such that farmers can link directly with markets and accumulate maximum value.

- Scheme of Ministry of Food Processing Industries – promotes cold
- Scheme of Agricultural & Processed Food Products Export Development Authority (APEDA) – promotes cold chain linked to international markets especially, pack-houses for fresh fruits and vegetables.
- Scheme of National Cooperative Development Corporation (NCDC) – provides loans and venture capital to cooperatives in all sectors of agriculture, including horticulture.
- Five states have performed the best in PHM infrastructure creation - Gujarat, Maharashtra, Karnataka, Uttar Pradesh & Andhra Pradesh the 5 states which have not performed well in the creation of post-harvest & bottlenecks in this aspect. Assam, Bihar, West Bengal, Jharkhand & Odisha.

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