8th – Crop Production & Management I

Food is one of the basic necessities of life for all living organisms. Food provides energy for carrying out all body functions such as digestion, respiration and excretion. Food is required for growth, development and body repair. It also protects the body against diseases.

Food from plants: Growing plants and rearing animals for food, clothing and other useful products is called Agriculture. Plants of the same kind growth on a large scale for food, clothing etc are called crops. Example: several plants of maize grown in a large field from a crop of maize. Example of food crops are cereals, pulses.

Agriculture: Agriculture is the science and practice of farming and cultivation of crop plants. It is derived from a Latin word meaning field and cultivate.

In olden times, due to outdated agricultural implements, the production was less. But nowadays, new technologies have boosted agricultural practice and crop yielding along with rearing of livestock including poultry called 'Animal Husbandry'.

Horticulture: (Hortus- garden, culture- cultivation) is a branch of agriculture that deals with the production of vegetables, fruits and ornamental (decorative) plants. It is similar to agriculture but is usually carried on a small scale. Some important horticultural crops of India are potato, tomato, cabbage (vegetables), apple, guava, pear (fruits), rose, jasmine, croton (ornamental plants).

Agricultural Practices: tasks performed by the farmer to raise a good yield of crops are called 'agricultural practices'. The tools used for doing various activities in cultivation of plants are called 'agricultural implements'.

Based on the growing season, the crops grown in India can be classified as

1. **Soil preparation:** Soil is the main medium in which plants grow. Roots of plants absorb water, air and vital nutrients from soil. In order to ensure that these are readily available to the roots, the soil is 'prepared' before growing a crop. Soil preparation involves ploughing, leveling and applying fertilizers.

Ploughing: The process of loosening and turning the soil is called or ploughing or tilling. This process is important because of the following reasons.

- It allows the roots to reach deeper into the soil. This helps to fix the plant more firmly to the ground.
- It helps in trapping air in the soil, which is necessary for roots to 'breathe'.
- It helps the soil to retain moisture for a longer duration.
- It helps in bringing nutrient-rich soil to the top.
- It helps the soil to mix well with fertilizers.

It helps in the removal of undesirable plants called weeds.

Organisms like earthworms also in 'Ploughing' the field, as their burrowing action helps in loosening and turning the soil. These organisms also help in the decay of dead plants and animals in the soil. This process leads to the formation of a substance called humus, which is rich in nutrients for plants.

Nowadays, implements called cultivators, which are driven by tractors, are increasingly being used for ploughing. This saves both time and effort.

Leveling: Even after ploughing, big lumps of soil (called crumbs) may remain in the field. These are crushed using wooden or iron planks called levelers and this process is called leveling.

2. **Selection and sowing of seeds:** The next step is selection and sowing of seeds. This is the most important stage of crop production. In India ,a government body called the National Seeds Corporation (NSC) is involved in the production of good-quality agricultural seeds. NSC has also helped in setting up seed-testing Laboratories in different parts of country. Plants grow from seeds. While selecting seeds, following precautions should be taken:

1. Only clean, healthy and disease-free seeds should be selected.
2. Seeds should be treated with fungicides (chemicals that kill disease-causing fungi).

Sowing of seeds is the process of placing seeds in the soil. Care must be taken while sowing them. Seeds have to be sown

1. At the right depth, neither too shallow nor too deep.
2. At right intervals so that they get proper air, sunlight and nutrients.

Tasks	Implements Used	Functions of Implements
1. Preparation of Soil: Ploughing Levelling Manuring	• Animal driven wooden or iron ploughs or machine driven tractor • Tractor or animal driven iron or wooden levelers. • Manually or by drill	• Pulverising, uprooting the stubbles. • Making soil surface even for uniform irrigation
2. Sowing	By hand or seed drills	Putting seeds in the prepared soil
3. Addition of manure/ fertilizer	By hand or using drill or sprayer	Addition of nutrients needs by plants
4. Irrigation	Sprinklers/wells/tubewells/ canals	Supplying water to plants
5. Weeding	Trowel, Harrow, Spraying	Removal of weeds (unwanted plants)
6. Crop protection	Sprayer/ manual or aerial spray by low flying helicopter	Control of diseases caused by plant pests, bacteria etc.
7. Harvesting	Sickle, Harvester Combine for both harvesting and threshing	Reaping of crop plant
8. Threshing	Manually, Thresher, Combine, Animals	Separation of grains
9. Winnowing	Winnowers, Combine, Thresher	Removal of hay and chaff
10. Storage	Silos, Gunny bags, clay and metal containers	Storing grains for future buffer stock.

Overcrowding may result in competition for air, Sunlight and nutrients among the young Plants that emerge from these seeds. Such Competition is harmful for the young growing Plants. Seeds are sown in the field by any of the methods described below:

Broadcasting or manual method: The method in which the seeds are scattered over the field by hand is called broadcasting. This method is not efficient because it cannot ensure proper spacing between seeds and also does not help to sow them at the right depth.

By traditional tool: The traditional tool for sowing seeds is shaped like a funnel having two or three vertical long tubes with sharp ends. The seeds are filled into the funnel passed down through the pipes with sharp ends. The sharp ends pierce the soil and place the seeds there.

By seed drill: A seed drill has a funnel- shaped seed bowl connected to several tubes. The drill is attached to a plough. As the plough makes furrows along the field, the seeds in the seed bowl are released through the tubes and get deposited in the soil. Nowadays, a seed drill is used for sowing seeds with the help of a tractor. The advantages of using a seed drill for sowing seeds are as follows:

1. It sows the seeds uniformly at appropriate distances and depths.
2. It ensures that seeds get covered with soil after sowing. This prevents the damage caused by birds.
3. It saves time and labour.

3. Transplantation: Seeds of some plants like paddy, tomato, onion, chili and brinjal are first grown in small nurseries. When seedlings grow, they are manually transplanted in the field. The process of transferring the seedlings from nurseries to fields is known as transplantation. This practice has the following advantages:

1. It helps in selecting and planting only healthy seedlings.
2. Spacing can be controlled because of manual plantation.
3. Plants get sufficient sunlight, nutrients and water from the soil.

4. Weeding: the removal of unwanted plants (weeds) growing along with desired crop from the field is called weeding. The most common weeds are Amaranthus (chaulai), Convolvus (hiren khuri), grass etc. Weeds are required to be removed because they compete with the crop plants for their basic needs like water, sunlight , nutrients. Weeds often grow faster than the main crop. The process of removing weeds from the field is done by two ways:

1. **Manually**: by pulling out the weeds with the help of trowel (khurpa).
2. **Use of weedicides**: certain chemicals are sprayed in the filed with the help of a sprayer. Some common weedicides are 2,4 D, Dalapon, Metachlor and Siniazine. These are poisonous chemicals. Therefore grains as well as other crops must be washed thoroughly before use. During spraying, farmer must cover his nose and mouth.

Manures and Fertilizers

1. Manure: Manure is an organic compound (rich in nutrients) obtained by the decomposition of plant and animal wastes by microbes

a. Compost: Compost is prepared by the decomposition of farm and domestic organic waste materials like animal excreta, faecal matter of human beings, sewage wastes, weeds, dry leaves, etc in a compost pit. The process of producing compost is called **composting.** Composting as a biological process in which microbes decompose the organic matter (present in organic waste materials) to produce manure. Compost is rich in organic nutrients but not in some essential nutrients like nitrogen, phosphorus and potassium.

b. Green manure: Some crops like sunn, hemp or Sesbania are grown in field before sowing the seed. They are then ploughed back into the soil when seedlings are young. These plants decompose in soil and increase soil fertility. They also provide protection against soil erosion and leaching.

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2. Fertilisers: they are human-made chemical substances which are rich in one or more nutrients like nitrogen (N), phosphorus (P) and potassium (K). They are produced in factories. Some examples of fertilisers are:

a. Nitrogenous fertilisers-urea, ammonium sulphate, sodium nitrate
b. Phosphatic fertilisers-superphosphate, ammonium phosphate
c. Potassic fertilisers-potash, potassium sulphate
d. Complex fertilisers: nitrophosphate, urea, ammonium phosphate
e. Bio-fertilisers are the living organisms that can increase fertility of the soil. Nitrogen fixing bacteria are used as bio fertilisers which enrich the soil.

S No.	Manure	Fertiliser
1	They are not soluble in water. So they are not easily absorbed by the roots of the plants.	They are easily soluble in water and are absorbed by the plants easily.
2	These are organic substances	These are inorganic substances
3	They are not nutrient specific.	They are nutrient specific
4	These are bulky and hence difficult to store.	These are in powdered form and easily stored.
5	They restore the soil texture and help in water retention.	They may damage the soil texture and make it more porous.

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