CROP PRODUCTION & MANAGEMENT

CONTENTS

CROP

The plants which are grown by man in large numbers to get useful products are known as crops.

◈ Agriculture :

- The process of growing crops on a large scale is called agriculture.

◈ Horticulture :

- It is the process of growing fruits, vegetables & ornamental plants.

CROP SEASON

In India there are two main crop seasons for cultivating crops. These are known as **rabi seasons** and **Kharif season.**

◈ Rabi Crops :

- These crops are sown in the beginning of winter i.e. between October and November, and harvested by March or April. These crops do not depend on monsoon rains.

Exmaples : Wheat, barley, gram, potato, mustard.

◈ Kharif Crops :

- These crops are sown at the beginning of the monsson seasons between June and July, and harvested by September or October. These crops depend on monsoon rains for growth.

AGRICULTURE IMPLEMENTS

The tools which are used in cultivation of plant are known as agricultureal implements.

Name of implement	Uses	Name of implement	Uses
Khurpa	For weeding	Seed drill	For sowing
Spade	For digging	Harrow	For weeding
		Sickle	For harvesting
Wooden plough	For tillage	Combines	For harvesting and
Iron plough	For tillage		threshin
Soil plank	For breaking crums	Sprayers	For spraying
Leveller	For leveling and		insecticides
	Pressing the soil		

BASIC AGRICULTURAL PRACTICES

All the activities which are involved in cultivation of crops, from sowing to harvesting, are known as **agricultural practices**.

PREPARATION OF THE SOIL

This is the first essential stage for cultivating any crop plant. Preparation of soil involves the following step – ploughing and digging, levelling and manuring.

Ploughing and Digging :

- The process of loosening and turning up of the soil is called tilling or ploughing. This is done by using a wooden or iron plough.

Levelling :

- Soil, if ploughed in dry season, breaks into big mud pieces called crumbs. It is necessary to break these crumbs with the help of a wooden plank or iron leveller. The field is levelled for sowing as well as for irrigation.

Manuring :

- Mixing soil with manure is called manuring. manure is usually added to the soil both before and after tilling. Adding manure before tilling helps in proper mixing of manure with the soil.

SOWING

- The process of putting seeds into the soil is called sowing.

◈ Methods of Sowing :

- Seeds are sown in the field by any of the three methods described below.

Broadcasting :

- Seeds are sown manually by directly scattering them into the soil. This process is called broadcasting.

Seed Drills :

- The other method is to use a seed drill. A simple seed drill consists of an iron tube with a funnel at the top attached to the plough.

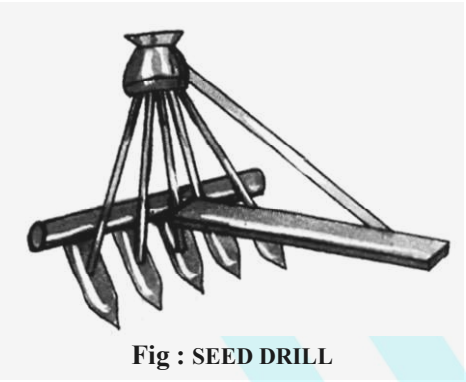

Fig : SEED DRILL

Transplantation :

- There are certain crops like paddy and some vegetables for which seeds are not directly sown in the field and then the seedlings are transferred to the main field. This process is known as transplantation.

APPLYING MANURES AND FERTILISERS

Crops absorb various nutrients from the soil through their roots. They are required for their growth and development. The replenishment is done by adding mannures and fertilisers to the soil. This process is called manuring.

◈ Manures :

- Manures are natural, organic substances obtained by the decomposition of animal wastes and plant residues. They supply essential nutrients and humus to the soil and make it fertile. Manures are of the three kinds : farm yard manure, compost and green manure.

Farm Yard Manure :

- It consists of cattle dung, urine, straw, leaves and other farmyard wastes.

Compost :

- It is the manure obtained by the decomposition of dead plants and animal wastes, sewage waste, etc. It is made by burying all available organic material in a pit with alternative layers of soil and leaving it to rot.

Green Manure :

- Green manure is formed by the decomposition of fast growing leguminous plants like guar and sunhemp. These plants are grown and ploughed back into the soil.

◈ Advantages of Manure :

- It enriches the soil with nutrients.
- It adds organic matter to the soil which improves the quality of soil.
- It increases water-holding capacity in sandy soil and drainage in clay soil.
- It increases the population of useful microorganism in the soil
- It improves and maintains the quality of the soil for a long time.

◈ Fertilisers :

- A fertiliser is a man-made inorganic compound which supplies specific nutrients to the soil. The most commonly used fertilisers are the NPK fertilisers which are rich in nitrogen, phosphorus and potassium. Chemical fertilisers have becom popular with farmers because most of them are soluble in water and can be easily absorbed by plants. They are also easy to store and handle.
- Fertilisers are applied either by broadcasting in the field or by spraying or through irrigation channels. Some examples of commonly used fertilisers are urea, ammonium sulphate, superphosphate and potassium nitrate.
  Table gives the differences between manures and fertilisers

Difference Between Manure & Fertiliser

	Manure		Fertiliser
1.	Mannures are natural substances. They are formed from dead, decaying organic matter and animal wastes like cow dung, plant residues.	1.	Fertilisers are salts or inorganis compounds. They are produced in factories from chemicals.
2.	Mannures contain all the essential nutrients required for plants but in small amounts.	2.	They are rich in plant nutrients like nitrogen, phosphorous and potassium.
3.	They are very slow-acting on soil.	3.	They are quick in action.
4.	They provide humus to the soil and also improve its quality	4.	They do not improve the quality of the soil.
5.	Manures are not absorbed quickly by the plants as they are not easily soluble.	5.	They are soluble in water and can be readly and directly absorbed by the plants .
6.	These are not nutrient specific.	6.	These are nutrient specific.
7.	Mannures are require in large amount.	7.	They are concentrated and hence required in small quantities.
8.	These are inconvenient to store, transport or apply.	8.	They can be conveniently transported, supplied and stored.
9.	They take long time to show results and require long time for their preparation.	9.	They show immediate results and take less time in their manufacturing.
10.	If applied in large quantities, they do not harm the plants.	10.	If applied in large quantities, they may kill the plants.

◈ Natural methods of Replenishing the Soil with Nutrients :

Leaving the Field Fallow :

- It is the process of leaving the field uncultivated (fallow) for one or more seasons. Fallow land will regenerate the lost nutrients. However, due to high demand of foodgrains this method is no longer followed.

Crop Rotation :

- It is the method of growing different crops alternately on the same land. Earlier, farmers in northern India used to grow legumes as fodder in one season and wheat in the next season. This practice was helpful in the replenishment of the soil with nitrogen. Farmers should be encouraged to adopt this practice.

Multiple Cropping :

- Sometimes two or more crops are grown together in the same field. This practice is called mixed cropping or multiple cropping. The crops are chosen in such a way that the products and waste materials from one crop help in the growth of the other. Cotton and groundnut crops are often grown together for this reason.
- However, these methods alone are not enough to maintain soil fertility and farmers have to add mannures and fertilisers from time to time.

➢ IRRIGATION

Plants need water for proper growth and development. Seeds need water for germination. Plants need water to draw nutrients from the soil and for making food by photosynthesis. Water helps the plant to translocate food from one part to other parts of the body. It also protects the crop from frost and extremely hot air currents. Thus water plays an important role in the life of plants right from the germination stage to the maturity stage.

◈ Sources of Irrigation :

- The main sources of irrigation in our country are rivers, lakes, ponds, wells, tubewells, dams and canals. Water from these sources is delivered by irrigation canals or pumped by using electric or diesel pumps.

◈ Traditional methods of Irrigation :

- In our country traditional systems of irrigation like the pulley system (moat), chain pump, lever system (rahat) and dhekli have been in use for centuries to lift water from water reservoirs and supply it to the field for irrigation. These methods are cheaper but less efficient.

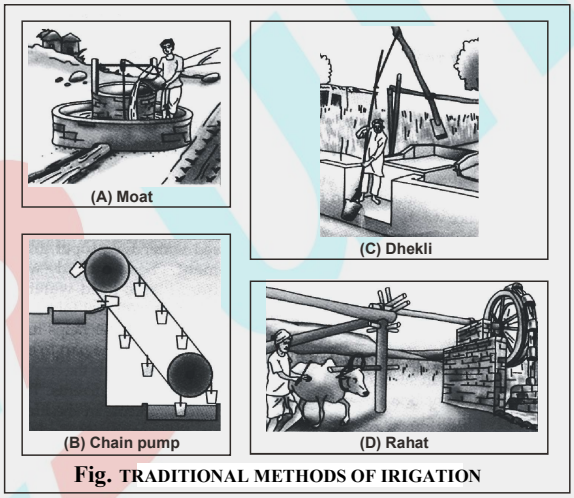

Fig. TRADITIONAL METHODS OF IRIGATION

◈ Modern methods of Irrigation :

- There are four modern methods of irrigation commonly used in India : -

Furrow Irrigation :

- In this method of irrigation, water is allowed to enter the field through channels or furrows made between two rows of crop

Basin Irrigation :

- In this method of irrigation, the field is just filled with water as in the case of paddy

Sprinkler Irrigation :

- This type of irrigation is used where the soil cannot retain water for a long time. Here the water is sprinkled by sprinklers.

Drip Irrigation :

- Drip irrigation is also called trickle irrigation or micro-irrigation. In this system water falls drop by drop just at the root zone. The system minimises the use of water and fertilizers. Drip irrigation is used by farms, commercial greenhouses and residential gardens.

◈ Disadvantages of Excessive or Untimely Irrigation :

- All crop plants require water at different stages of their development. Plants require the right amount of water at the right time.
- Excess of water (waterlogging) in the soil inhibits the process of germination of the seeds as the seeds do not get sufficient air to respire.
- Roots do not grow well if there is waterlogging in the field.
- If the crop is irrigated when fully mature, it gets damaged. The excess water from the field then has to be drained of immediately.

➢ WEEDING

Weeds are the unwanted plants which grow alongwith the main crops. They are undesirable because they compete with the main crop for nutrients, space, air, light and water, etc. and reduce the crop yield. They also spread pests onto the crops and sometime produce poisonous substances which are harmful to animals and humans.

The process of removing weeds from the field is called weeding.

◈ Time for weeding :

- The best time for the removal of weeds is before they produce flowers and seeds.

◈ Some Common Weeds :

- Some of the most common weeds found in crop fields are :

Wild oats (Javi).
Grass
Amaranthus (Chaulai)
Chenopodium (Bathua)

◈ Methods of Weeding :

Manual Weeding :

- Weeds may be removed manually either by uprooting them or by cutting then with the help of tools like handfork, khurpa and harrow.

By Using weedicides :

- The chemical substances which destroy (kill) weeds but do not harm the crop are called weedicides or herbicides. Some common weedicides in use are : Dalapon, Metachlor, Siniazine and Butachlor. These weedicides are diluted in water and sprayed in the field with a sprayer.
- Weedicides must be used with care as they are poisonous and have side effects if consumed. Farmers should cover their nose and mouth with a piece of cloth during spraying.

Biological Method :

- Weeds can also be controlled by biological methods. For example, cochineal insects are used to control the growth of the weed called opuntia.

◈ Protection of crops :

- Pests are organisms that attack and damage crops. They may be rodents (rats), insects (locusts, weevils, termites), stray animals and birds. It is estimated that 10% of our crop is destroyed every year by these pests.

  Crops are also attacked by bacteria, fungi and viruses by causing several diseases. There diseases reduce the quality and quantity of the product. these diseases get transmitted through seeds, air, soil or through insects.

◈ Pesticides :

- The chemical substances which kill pests without harming the crops are called pesticides. These chemicals are sprayed by using a sprayer. the following chemicals are used to kill these pests.

Insecticides :

- These are used to destroy insects. *Examples* : DDT, BHC, Malathion.

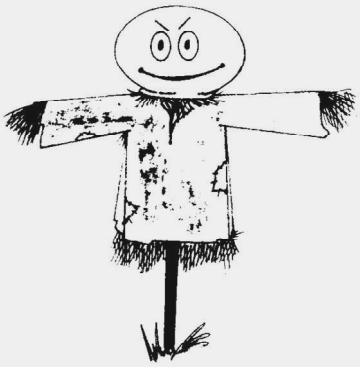

Figure : SCARECROW TO KEEP BIRDS AWAY FROM THE CROP

Fungicides :

- These are used to destroy fungi. *Examples* : sulphur, lime sulphur

Rodenticides :

- These are used to kill rodents. *Examples :* zinc phosphide, warfarin.

Insecticides, Fungicides and rodenticides are collectively called pesticides

- Birds can be scared away by putting scarecrows in the fields as shown in Fig.

➢ HARVESTING

Once the crop has matured, it has to be gathered. The process of cutting and gathering a matured crop is know as harvesting.

All over the world harvest season is celebrated with excitement. Baisakhi, Holi, Pogal, Diwali, Nabanya and Bihu are some of the harvest festivals celebrated in India.

◈ Harvesting of grain Crops :

- Most of the grain crops are reaped close to the ground with the help of a sickle.

Threshing :

- The process of separating the grain from the harvested stalks of hay is known as threshing. This is done by spreading the harvested crop on the ground and walking over them. Animals such as bullocks, buffaloes or camels are also used on a large scale for this purpose.

Winnowing :

- The process of separating the grain from the chaff is known as winnowing. Farmers hold the mixture of grains and chaff at a height and allow them to fall in a gentle stream. The wind blows away the chaff which is lighter. The heavier grains fall directly on the ground below and are thus separated.
- Big farms use huge machines called combines which cut, thresh as well as separate the grain from the chaff.

Harvesting of other crops :

- Besides grain crops, all other crops like vegetable crops, cash crops, etc. are harvested through different processes and techniques. Plucking, gathering, packing, storing of crops, etc. are the different steps in the process of harvesting some specific crops.

➢ STORAGE

There are two types of food materials perishable and non-perishable.

Perishable food materials :

- Perishable food materials are those which get spoiled easily when kept for sometime at room temperature, for example, vegetables, fruits, fish, meat and milk.

Non-perishable food materials :

- Non-perishable food materials are those which do not get spoiled even when kept for a long time at room temperature, for example, wheat flour, food grains, spices and sugar.

◈ Modes of storage :

- There are two different modes of storage : dry storage and cold storage.

Dry storage :

- This method is used for storage of non-perishable food materials. Foodgrains are dried in the sun to bring down the moisture content should be below 14% of weight to prevent the attack by pests. The dried foodgrains are then weighed, packed in gunny bags and transferred to properly ventilated halls called godowns or granaries.
- The gunney bags in the godown should be kept about 60 to 70 cm away from the walls and on wooden platforms about 10 to 15 cm above the ground. The godown must be kept free from pests by spraying various pesticides from time to time.
- Grain silor are specially desined tall cylindrical structures for bulk storage of foodgrains. These silor can store different stocks of foodgrains at different levels. The required foodgrain can be taken out from the openings provided in the silor.

Cold storage :

- This method is used for storage of perishable food materials. These food material have very short shelf-life so that these are usually stored at low temperature.
- Icebox or refrigerator is used at home to store fruits, vegetables, milk, milk products, fish, etc. On commercial scale, the perishable food materials are stored in either a deep freezer or a cold storage.

◈ **Advantages of Food Storage :**

- It prevents the food from being spoiled by the action of enzymes and microorganisms.
- It increases the storage period of food materials.
- It helps in the availability of season fruits and vegetables around the year
- It makes the transportation of food materials easier.
- It helps to maintain prices in the market.

➢ ANIMAL HUSBANDARY

The keeping of animals for specific purpose is called **domestication**. All domesticated and useful animals constitute **livestock**. The breeding, feeding and carrying of livestock for food and other useful purpose is known as **animal husbandry**.