

INTRODUCTION

- All organisms require food for their growth and survival.
 - Food is the combination of various organic and inorganic substances which are capable of providing energy for the various metabolic activities.
 - In all cases the food for animals comes directly or indirectly from plants.
- ☐ **Sources of food :**
- ☐ **Cereals :** These are rich in carbohydrate and thus provide energy.
eg. – Rice, wheat, maize, sorghum, barley, millets.
- ☐ **Pulses :** These are rich in protein and thus helpful for body building.
eg. – Gram, moong, pea, lentil, urd, pigeon pea.
- ☐ **Oil seed crops :-** These are rich in oil and fatty acids.
eg. – Groundnut, sunflower, soyabean, mustard, sesame.
- ☐ **Vegetable crops :** These provide vitamins, minerals along with small quantities of carbohydrate protein and oils.
- Leaves : Cabbage, spinach, trigonella, lettuce
Roots : Carrot, radish, turnip, sweet potato
Stems : Potato, cooms, rhizomes (ginger)
Bulbs : Onion, garlic
Fruits : Tomato, brinjal, gourd, cucumber
Flowers : Cauliflower, bauhinia, banana
- ☐ **Fodder crops :** These provide green fodder to the cattle.
eg. – Berseem, sorghum, maize, oat, sudan grass, alfalfa.
- ☐ **Crops :** Plants of same kind which are grown and cultivated at one place on a large scale are known as crops.
- Different types of crops require different climatic conditions like temperature, humidity and photoperiods.
 - Crops are divided into two groups on the basis of growing season.
 - **Kharif crops :** These crops are sown in the months of June/July and harvested in September/October every year.
eg- Paddy, maize, sugarcane, sorghum, pearl millet.
 - **Rabi crops :** These crops are sown in the months of October/November and harvested in March/April every year.
eg- Wheat, oat, barley and pea.

COMPETITION WINDOW

Plantation crops : These crops are grown for commercial purposes which increase cash.
e.g. Tea, Coffee, Rubber, Coconut.

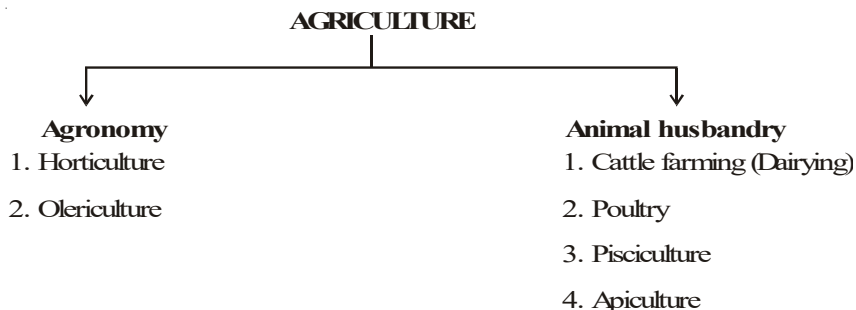
First cultivated crops were cereals such as rice, wheat, barley and corn.

S.No.	Kharif crops	Rabi crops
1	These are autumn or monsoon crops. The sowing starts in rainy season.	The sowing starts in winter season.
2	They are sown in June-July.	They are sown in October- November.
3	They are harvested in September-October.	They are harvested in March-April.
4	They require warm and wet weather.	They require dry and cold weather.
5	They need a lot of water.	They do not need lot of water.
6	They can be converted into rabi crops if plenty of water is available.	They can not be converted into kharif crops.
	eg. – Rice, Cotton, Bajra, Jowar, Groundnut, Maize, Mango, Spinach.	eg. – Wheat, Barley, Gram, Pea, Soyabean, Mustard, Linseed, Potato, Orange, Apple.

COMPETITION WINDOW

Zayed crops : These crops are sown in March/ April and harvested before rainy season, Most plant are vegetables and fruits like cucurbits (cucurbita, lagenaria (sweet ghia), Gourd bitter gourd (Karela), melons and moong (pulse). Zayed crops do not include any grain crop.

- ❑ **Agriculture :-** Word agriculture has come from two Latin words, ager meaning field or soil : culture meaning cultivation. Agriculture or farming is the cultivation of the soil. It includes growing of plant crops and rearing of animals.
- It is an applied biological science which deals with the production of plants and raising of livestock for human use.



COMPETITION WINDOW
Horticulture is the science of growing and management of fruits and flowering plants in orchards and gardens.
Olericulture is the science of growing and management of vegetables.
Silviculture : Cultivation of wood and trees. e.g. Teakwood, Pine.
Floriculture is the science of growing decorative plants, specially of flowers. e.g. Rose, jasmine, gladioli, marigold.

❑ **SOME PLANT CROPS**

Kind of crop	Exm aple
Sugar yielding crops	Sugarcane, beetroot
Fruits	Apple, plums, cherry, papaya, grapes, mango, banana, cirtus (lemon, oranges)
Oil seeds (non-edible)	Castor, linseed (alsi)
Medicinal plants	Mint, tulsi, neem
Beverages (plantations)	Coffee, cocoa, tea
Spices	Ginger, turmeric, chillies, pepper, coriander,
Fibres	Cotton, jute, hemp
Wood (Timber) (forest plantations)	Teak, saal, seesham, deodar, kail and cheel (pines), bamboos.
Rubber plantations	Rubber plant (<i>ficus elastica</i>)
Essential oils	Sandalwood oil, clove oil, eucalyptus oil.

- ❑ **Basic requirements of agriculture :**
- An open field which gets plenty of sunlight and air.
 - Properly loosened and aerated soil in the fields.
 - Sufficient source of water for irrigation.
 - Proper nutrients for the growth of plants.
 - Removal of weeds which use up the nutrients in the soil.
 - Proper fencing of the field towards off grazing animals.

DO YOU KNOW?

- ❑ **Modern agriculture** :- Modern agriculture is a combined effort of art, science and technology to provide food, cloth and shelter to increasing human population. To improve the efficiency of the agriculture process and increase output following steps are taken:
 - Highly efficient tools and machines are made and used.
 - Building of dams and canals for irrigation.
 - Development of pest resistant and high yielding variety.
 - Use of fertilizers and pesticides for nutrition and protection of crop respectively.
- ❑ **Sustainable agriculture** : The practice of farming and production of maximum agriculture yield through management of natural resources without disturbing the environment is known as sustainable agriculture.



REVIEW QUESTIONS



1. What are zayed crops?
2. What is agriculture?
3. Name the two plantation crops.
4. When are Kharif crops sown?

**AGRICULTURE PRACTICES**

Activities which are carried out by the farmer to ensure good crop yield in particular sequence till the crop mature at harvest are known as agriculture practices.

(i) Soil preparation :

- | | | |
|----------------|----------------|---------------|
| (a) Ploughing | (b) Levelling | (c) Manuring |
| (2) Sowing | (3) Irrigation | (4) Weeding |
| (5) Harvesting | (6) Threshing | (7) Winnowing |
| (8) Storage. | | |

(i) **SOIL PREPARATION** Various process are included in it.

(a) **Ploughing or Tilling** – Process of loosening and turning of the soil is called ploughing or tilling.

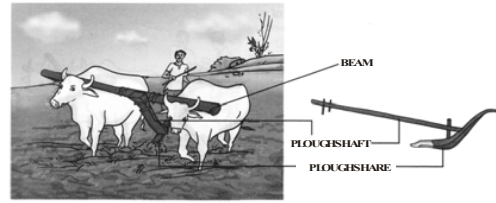
**Advantages of ploughing :**

- It allows mixing of manure and fertilizer more uniformly.
- Seeds are also able to germinate more easily.
- It allows good root penetration so the plant is held firmly to the soil.
- Roots are able to breathe more easily.
- Loosened soil promotes growth of worms and microbes which help to maintain the fertility of soil.

DO YOU KNOW?

- ❑ **Agriculture implements :** The tools required for carrying out the activities involved in the cultivation of plants are known as agriculture implements.

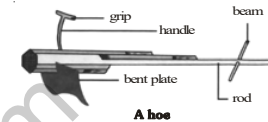
- ❑ **Plough :** It contains triangular iron strip called ploughshare and main part of the plough is a long log of wood called ploughshaft. One end of the shaft is handle and other end is attached to a beam which is placed on the bulls necks.



THE PLOUGH

One pair of bulls and a man can easily operate the plough.

- ❑ **Hoe :** This is used for removing weeds and for loosening the soil. It has a long rod of wood or iron. A strong, broad and bent plate of iron is fixed to one of its ends and works like a blade. It is pulled by animals.



A hoe

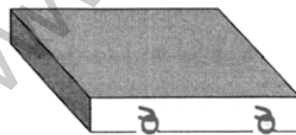
- ❑ **Cultivator :**

Ploughing can also be done by tractor driven cultivator. The use of cultivator saves labour and time.

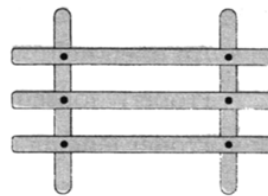


Cultivator driven by a tractor

- b) **Levelling :** Tilled soil may have big blocks of soil (crumbs). Crumbs are broken down and soil is levelled with wooden planks or iron leveller, the process called levelling. Levelling is done for better sowing and irrigation.



A plank used to level the soil



An iron leveller

Soil levellers

- ❑ **Advantages of levelling :**
- It helps in uniform distribution of water and manure.
 - It prevents the loose soil from being eroded by water or air.

REVIEW QUESTIONS

1. What are the various steps in the preparation of the soil?
2. What are the advantages of turning the soil?
3. What are the advantages of levelling?
4. Why is soil turned and loosened before seeds are sown?

- (c) **Manuring** : Farmers have to add manure to the field to replenish the soil with nutrients, the process known as manuring.
- ❑ **Manure** : These are organic substances, obtained from the decomposition of plant and animal wastes.
- ❑ **Advantages of manure** :
- It increases the number of friendly microbes.
 - It improves the texture of soil by adding organic matter (humus) .
 - It increases soil fertility, water holding capacity and aeration.
 - It reduces soil erosion.
 - It is cheap.
- ❑ **Disadvantage of manure** :
- They have less amount of nutrients as compared to fertilizers.
 - Manures are bulky and not easy to store and transport.

COMPETITION WINDOW
Types of manures : Compost : It is a type of manure which is produced from the plant and animal wastes by the action of microbes. Green Manure : It is a type of manure which is produced by the sowing and back ploughing of fast growing crops. e.g. Mustard, alfalfa. Farm yard manure : It consists of cattle dung, farm refuse, fallen leaves and twigs. Vermicompost : It is the type of manure which is produced by the degradation of organic wastes through the consumption by the earthworms. This process is known as vermicomposting .
Earth worms are called as farmer's friends because the burrowing action of earthworm helps to loosen the soil particles and then improves the physical structure of soil by adding humus. Vermiculture : Cultivating worms and earthworms. Organic farming : It is a kind of farming system in which the harmful chemicals (fertilizers and pesticides) are not used. In place of chemicals (fertilizers and pesticides) the use of organic manures, biofertilizers and biopesticides are recommended.

- ❑ **Fertilizers** : These are commercially manufactured inorganic salts containing one or more essential plant nutrients like NPK, which are used to increase soil fertility.
- ❑ **Advantages of fertilizers** :
- They are nutrient specific and required in small amounts.
 - They are water soluble and absorbed by the plant easily.
 - They are easy to store and transport.
- ❑ **Disadvantages of fertilizers** :
- Fertilizers can change the soil structure by killing the soil microbes.
 - Fertilizers can change the chemical composition of soil.
 - Accumulation of fertilizers in water bodies causes eutrophication.

COMPETITION WINDOW
Eutrophication : The excessive growth of plants on the surface of water bodies due to excessive use of fertilizers in the field which flows into the water bodies with rainy water is called eutrophication.
Types of fertilizer : Nitrogenous : Sodium nitrate, Urea Phosphatic : Amonium phosphate Potassium : Potassium sulphate Mixed : NPK, CAN
Only urea is an organic compound fertilizer.

DO YOU KNOW?

Methods for maintaining soil fertility without use of fertilizers

- ❑ **Field fallow** : The practice of leaving the field uncultivated for a season is called field fallow.
- ❑ **Crop rotation** : The practice of growing different crops in succession in the same field is called crop rotation.
- ❑ **Biofertilizers** : Organisms which enrich the soil nutrients due to their biological activities are called biofertilizers. e.g. *Rhizobium* bacteria, *Nostoc* and *Anabaena* (BGA) .
- ❑ Body of the living organisms is made of proteins. Proteins are the compounds of nitrogen, carbon, oxygen and hydrogen. Air nitrogen is fixed into compounds of nitrogen (Nitrogen oxides solution in water) by certain microorganisms. Microorganisms such as *Rhizobium* (= *Bacillus*) bacterium is present in the root nodules of Leguminous plants Bacterium *Rhizobium radicum* is capable of fixing air nitrogen. Fixation of nitrogen enriches soil in a natural way.
- Nitrogen fixation is the process of combining oxygen with nitrogen to form nitrogen compounds such as nitrites (NO_2) and nitrates (NO_3) .
- Blue green algae are common along drains, wet places and flooded paddy fields. *Anabena*, *Oscillatoria*, *Nostoc* and *Gleocapsa* are common examples of blue green algae.
- **Root nodules** : Roots of leguminous plants bear root nodules. Root nodules house *Rhizobium*, a nitrogen fixing bacteria. Nitrogen fixed by the bacterium is supplied as additional nitrogenous nutrition to the leguminous plant (host) . In turn, the host plant provides shelter and carbohydrate food to the bacterium. Thus, the bacterium and the leguminous root nodules are living together for mutual benefit. This process in which two organisms live together for mutual benefit is called **symbiosis**.

❑ Differences between manures and fertilizers :

S.No	Manures	Fertilizers
1	These are organic substances obtained by the decomposition of plant and animal wastes.	These are artificial inorganic salts.
2	They are rich in organic nutrients, not rich in (NPK).	They are rich in Nitrogen, Phosphorus and Potassium (NPK).
3	They are not nutrient specific.	They are nutrient specific.
4	They are not soluble in water so absorbed slowly by plants.	They are soluble in water and absorbed quickly.
5	They are not harmful to the environment.	They are harmful to the environment.
6	They have nutrients in small quantity so needed in large quantity.	They have higher amount of nutrients so required in very small quantity.
7	They are bulky substances so difficult to store and transport.	They are in concentrated form and easy to transport and store.
8	They are prepared in field.	They are prepared in factories.

❑ Classification of plant nutrients :

- There are 16 essential elements for growth and development of plants. They are classify into two groups
- **Macro nutrients** : These are required in large quantity.
e.g - Carbon, oxygen, hydrogen, nitrogen, phosphorus, potassium, sulphur, calcium, magnesium.

- **Micro nutrients** : These are required in trace amount.
e.g - Iron, manganese, boron, zinc, copper, molybdenum, chlorine.

S.No.	Sources	Nutrients	Types
1.	Air	Carbon, Oxygen.	Macro nutrients.
2.	Water	Hydrogen.	Macro nutrients.
3.	Soil	Nitrogen, Phosphorus, Potassium, Sulphur, Calcium, Magnesium	Macro nutrients.
		Iron, Manganese, Boron, Zinc, Copper, Molybdenum, Chlorine.	Micro nutrients.

REVIEW QUESTIONS

1. What are the advantages of manure?
2. Write the name of frame work elements.
3. What are macronutrients and micronutrients?
4. What are the various ways by which soil can be enriched? Explain.
5. What is green manure?
6. What are biofertilizers?
7. What do you understand by field fallow?

(2) SOWING

The process of putting the seeds in the soil is known as sowing. Before sowing good quality (healthy and good variety) seeds are selected.

- ❑ **Selection of seeds** : For separating healthier seeds from a mixture of healthy and weak seeds, the seeds are placed in water. Healthy seeds sink and weak or insect eaten seeds float on water. Healthy seeds are separated and dried before sowing.
- ❑ **Sowing can be done by :**
- **Broadcasting** : Seeds are sown by hand or manually.
- (ii) **Traditional tool** : The tool used traditionally for sowing seeds has shape like a funnel. The seeds are filled into the funnel, passed down through two or three pipes having sharp ends. These ends pierce into the soil and place seeds there.



Traditional method of sowing

- (iii) **Seed drill** : Seeds are sown by the seed drill with the help of tractor. It saves time and labour.

❑ **Precautions during sowing seeds.**

- Use good quality, healthy and disease free seeds.
- The seeds are sown at a particular depth under the soil. Seeds left on the surface of the soil may be carried or destroyed by the insects and the birds. Seeds placed deep into the soil may either fail to germinate or may fail to come out into the air on germination.
- Distance should be proper to avoid overcrowding.
- Enough water should be there in the soil.

COMPETITION WINDOW

Planters : Planters are farm machines used for planting crops that grow in rows. Planter can sow the seeds and add fertilizers simultaneously.

cotton, maize and soyabean are all row crops.

DO YOU KNOW?

- ❑ **Transplantation :** Firstly seeds are sown in nursery and then seedlings are shifted to the main field. This process is known as transplantation. It enables the farmers to select the healthier seedlings.

eg.- Rice, Onion, Tomato, Brinjal and Chilli.



Transplantation

REVIEW QUESTIONS

1. Explain why seeds should be sown at the right depth.
2. Name the crop which is sown by transplantation.
3. Define transplantation.
4. What precautions we need to observe while sowing seeds?
5. Why do we need to keep requisite distance between two adjoining plants?

- (3) **IRRIGATION :** The process of artificial supplying of water to crop at different intervals is called irrigation. The time and frequency of irrigation varies from crop to crop, soil to soil and season to season.

Sources of irrigation : Well, tube well, ponds, lakes, river, canal and dams.

Methods of irrigation : Surface irrigation : In this type of irrigation the water is lifted from lake, well and canal by using following traditional ways like moat (pulley system), chain pump, dhakli, rahat (lever system) .



Moat (pulley system)



Chain pump



Dhakli



Rahat (lever system)

- These methods are cheaper and less efficient.
- These methods require cattle and human labour.
- The lifted water is allowed to run over the field. Surface irrigation can be subdivided into furrow and basin irrigation.

Furrow irrigation : The water is allowed to run through furrow between the ridges.

Basin irrigation : The field is flooded with water by making bunds all around it.

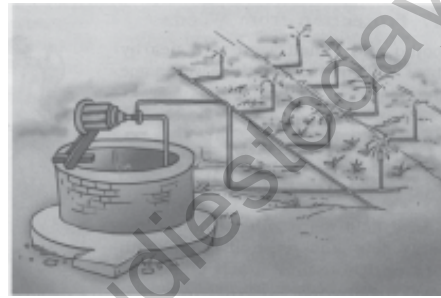
❑ **Disadvantages of traditional ways of irrigation :**

- They require more human labour and human efforts.
- They are less efficient so water is wasted in large quantity.
- They are not useful for poor water regions.

Nowadays the following modern ways of irrigation are used.

⌚ **Sprinkler system :-**

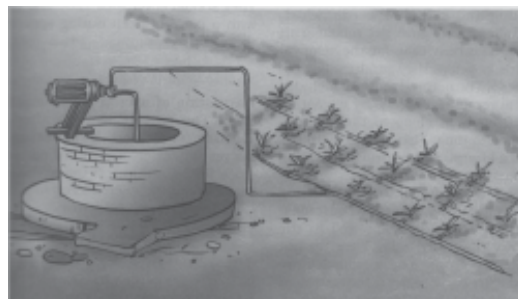
- In this system the perpendicular pipes having rotating nozzels on top, are joined to main pipe line at regular intervals.
- It spreads water uniformly over crop plants and field.
- This method is useful for sandy soil and uneven land.
- It is an efficient system in the canal irrigated area of Haryana and Rajasthan.



Sprinkler System

(ii) **Drip system or trickle irrigation :**

- It involves the use of pipes fitted with small tubes called emitters. The pipes are laid over or under the soil and emitters release water drop by drop around the roots of the plants.
- In this method water is not wasted at all.
- This method is a boon in poor water regions.
- This is the best irrigation technique for fruit crops, garden and trees.



Drip System

DO YOU KNOW?

❑ Other irrigation systems in India.

- (i) **Canal system** : Canals receive water from the rivers. The main canals are divided into branches which are further divided into distributaries to cover maximum areas for irrigation.
- (ii) **Tanks** : Tanks are water storage reservoirs which store the run off water of small catchment area.
- (iii) **Wells**
 - Dug well – Water is lifted up by bullock.
 - Tube well – Water is pumped up by using diesel or electric run pumps.
- (iv) **River valley system** : Due to heavy rainfall, many river valley are found in Western Ghats and Karnataka. This results in higher run off and discharge flows in the rivers. To prevent this coffee, rubber, coconut are cultivated on the slopes of these valleys and single rice crop is grown at bottom.
- (v) **River lift system** : Water is directly drawn from the river using pumps.

❑ Advantages of irrigation :

- It maintains the moisture of soil.
- It helps in germination of seeds.
- It helps in supply of essential nutrients.
- Nutrient dissolved in water get transported to each part of plant.
- It helps in growth of plants.

COMPETITION WINDOW

Fertigation : It is a method of applying fertilizers through drip irrigation.

Water logging : The situation of standing water in field due to excessive irrigation is called water logging. As a result of it, the roots fail to breathe and salinisation occurs.

Water lodging : Falling down of mature crops due to excessive irrigation or untimely rains and strong winds is called water lodging. It damages the quality and quantity of grains.

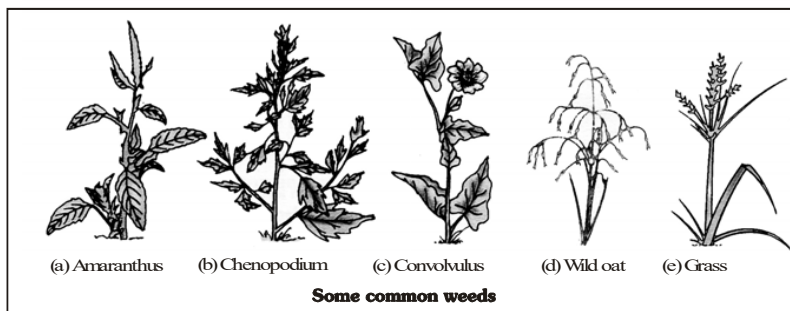
Rice plants that are transplanted in standing water need constant irrigation.

Clay soil retains a lot of water and hence need less irrigation, while sandy soil needs more water for irrigation.

- (4) **WEEDING** : Removal of weeds or undesirable plants is called weeding. It can be done by khurpa (trowel) and Harrow.

Weed : They are unwanted plants which grow along with a cultivated crop in a field. They can severely reduce crop yields by competing for light, water and nutrients.

Some common weeds : *Parthenium* (Gajar grass), *Convolvulus*, *Amaranthus* (Chaulai), *Chenopodium* (Bathua), *Xanthium* (Gokhroo) and *Dandelions*.



☐ METHODS OF WEED CONTROL

- (a) **Mechanical control** : It can be done by ploughing, burning and cutting of weeds before they produce flowers and seeds.
- (b) **Chemical control** : It can be done by spraying weedicides or herbicides (chemical which are used to kill the weeds).

e.g. 2, 4-D, 2, 4, 5-T, MCPA, Butachlor & Atrazine.



Spraying weedicide

- (c) **Biological control** : It is done by living organisms to destroy weeds.

e.g. *Cassia* plant prevents the growth of *Parthenium* weed.

e.g. Herbivorous fish (Carp) feeds on aquatic weeds (*Hydrilla*).

☐ Advantages of biological control :

- It does not cause pollution.
- Organisms are harmless to the main crop.

- ☐ **Crop protection management** : It includes eradication of pest, pathogens and other organisms that are harmful to the crop plants.

Pest : Organism which damage or destroy cultivated plants or plant products is called pest.

eg.- Insects, rats, mites and microorganisms.

Pathogen : Disease causing organism is called pathogen.

eg.- Bacteria, Fungi and Virus.

☐ Diseases of crop :

- ♣ **Seed born** : Spread through seeds and caused by fungi.

eg. Ergot of bajra.

- (ii) **Soil born** - Spread through soil.

eg. - Smut of bajra.

- (iii) **Air born** : Spread through air, eg. - Rust of wheat.

- (iv) **Water born** : Spread through water. eg. - Bacterial blight of rice.

- ☐ **Pesticides or Biocides** : These are chemical substances used to kill, control or repel pest.

Types of pesticides :

S.No.	Pesticides	Affected organisms	Example
1	Insecticides	Insects	DDT, Aldrin, Malathion
2	Fungicides	Fungal pathogens	Bordeaux mixture, Burgandy mixture, HgCl ₂

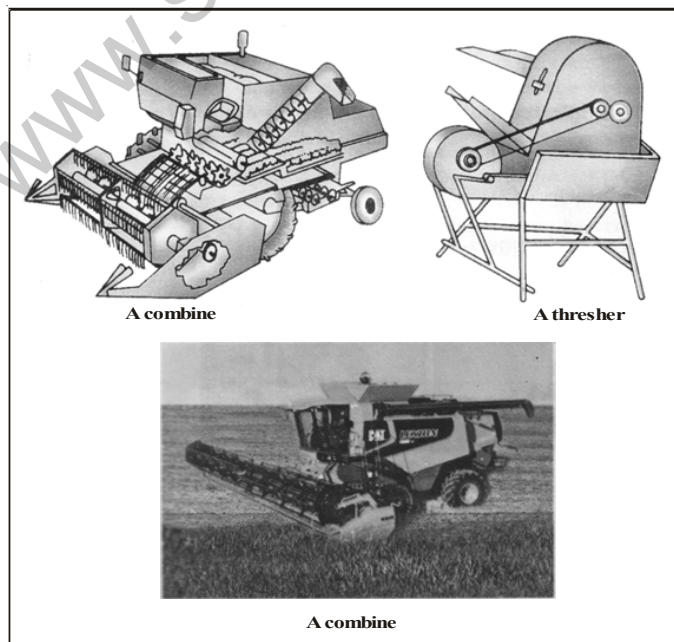
- ❑ **Advantages of pesticides :** They kill pest quickly, increase food production and are easy to store.
- ❑ **Disadvantages of using pesticides :**
 - They cause soil and water pollution.
 - Residue left on the fruits & seeds is harmful for human consumption.
 - They destroy even the useful insects.
- ❑ **Preventive measures avoiding use of pesticides :**
 - Crop rotation, multiple cropping and field fallow.
 - Sowing healthy seeds and summer ploughing.
 - Use of pest and disease resistant hybrid varieties of crop plant.
 - Field also need to be protected by grazing animals by raising wire fences and boundary wall.
 - Birds are scared away by raising scarecrows and beating of drums.

COMPETITION WINDOW

Scarecrows : A scarecrow is an image or an effigy in the shape of a human being that is placed in field to frighten away birds.

REVIEW QUESTIONS

1. What is fertigation?
 2. What is irrigation?
 3. What is surface irrigation?
 4. Which type of soil requires more water for irrigation?
 5. Mention three ways of removing weeds from the crop field.
 6. Write the names of two common weeds found in the field.
- (5) **HARVESTING :** The cutting and gathering of crops after its maturation is called harvesting. It can be done manually by sickle or by a machine called harvester.
- Many festivals are associated with harvesting season such as Baisakhi, Bihu, Onam, Pongal, Holi, Diwali.
 - Many crops require special harvesting machines. Cotton strippers (for cotton), corn pickers or huskers (for corn)
 - Fruits and vegetables are generally hand-picked when ripe.
- (6) **THRESHING :** The process of beating out the grain from the crop is called threshing. It can be done by threshers.



(7) **WINNOWER** : The process of separating the grains from the chaff is called winnowing.

- In this process, the grain-chaff mixture is gradually dropped on the ground from a height.
- The heavier seeds fall vertically down, while lighter chaff is blown away by wind.



Winnowing

COMPETITION WINDOW

Combine : A combine machine can harvest and thresh at the same time.

Chaff : Chaff is the material consisting of seed covering and small pieces of stem & leaves.

(8) **STORAGE** : Proper storage is necessary to get seasonal food regularly throughout the year. Freshly harvested grains have more moisture. If freshly harvested grains are stored without drying, then they may get spoil and lost their germination capacity. Hence before storing them the following precautions must be undertaken.

❑ Precautions :

- Grains should be safe from moisture, insects, rats, and microorganisms.
- Grains must be properly dried in the sun to reduce the moisture in it.
- Grains must be store in jute bags or metallic bins.
- Store grains in silos, granaries and godown with chemical treatment to protect them from pests.
- Dried neem leaves can be used for storing food grains at home.

❑ Factors affecting stored food :

1. Biotic factors : e.g. insects, micro-organisms, mites, birds, rodents and other animals.

2. Abiotic factors : e.g. moisture, humidity and temperature.

DO YOU KNOW?

- **Buffer stock** : Surplus stock of grains which is preserved for emergencies like drought and floods is called buffer stock.
- Food grains are stored in large godowns by agencies like Food Corporation of India (FCI) and state warehousing corporations.
- Fruits and vegetables which have high water content are stored at 0°C to 1°C temperature.
- Drying, canning and freezing are some of the methods of crop preservation.
- Drying reduces the moisture content, canning prevents the microbial growth and freezing reduces the rate of respiration of microbes.



Silos for storage of grains



Storage of grains in granaries

REVIEW QUESTIONS

1. What is harvesting?
2. Name some harvest festivals.
3. How is threshing done?
4. Define the term winnowing.
5. How does a farmer store the grains?
6. What factors may be responsible for loss of grains during storage?

CROP IMPROVEMENT

- ❑ **Green revolution** :- Yield of crop per hectare greatly increased due to the use of genetically improved variety of seeds.
 - Developed new varieties of rice, wheat and maize increased food production of India.
 - The desirable superior character in a variety can be incorporated through various methods of genetic improvement of crops like plant breeding and genetic engineering.
- ❑ **Plant breeding** : The science of improving crop varieties is called plant breeding. These involve introduction, selection of plant and than hybridization.

DO YOU KNOW?

Important plant breeders :

1. **N.E. Borlaug** - A maxican plant breeder who was awarded Nobel prize (1970) for developing high yielding varieties of wheat **Sonara-64** and **Lerma roja-64** [Father of green revolution]
2. **Dr. M.S. Swaminathan** - He has produced **Sharbati sonara** a variety of wheat by mutation which is responsible for green revolution in India. [Father of green revolution in India]

- ❑ **Hybridization** : The process of crosss breeding between two genetically dissimilar individuals is called hybridization. This process helps to produce hybrid variety with desirable characteristics.

Some hybrid/ Gm seeds

Wheat	Kalyan, sarbati, sonalika
Maize	Ganga, ambar, jawahar
Rice	Jaya, padma, pusa basmati, IR8
Bajra	Hb-1, HB-3 and 4
Soyabean	JS 335
Pea	Bougainvilleae
Brinjal	Pusa purple, Pusa Kranti
Cotton	G-57, Bt (Gm)

COMPETITION WINDOW

Emasculation : The removal of stamens (anthers) from a flower before they mature to bear pollens to prevent self pollination is called emasculation.

- ❑ **Objects of plant breeding** : Higher yield, Better quality, Blotic and abiotic resistance, Change in maturity duration, Wider adaptability, Desirable agronomic characteristic.
- ❑ **Genetic engineering** : The transfer of one or more genes (DNA fragments) from one plant to another is called genetic engineering. The plant in which the foreign gene has been introduced is called transgenic plant or genetically modified plant.
- ❑ **Cropping patterns** : Different ways of growing crops can be adopted to get maximum benefit.
 - (a) **Mixed cropping** : The growing of two or more types of crops on same field is called mixed cropping. The products and wastes from one crop can stimulate the growth of other crop in it.
 - (b) **Intercropping** : The growing of two or more crops grown in a definite row pattern is called intercropping.
 - (c) **Crop rotation** : The process in which different crops are grown alternately in the same field is called crop rotation.

ANIMAL HUSBANDRY

- ❑ **ANIMAL HUSBANDRY** : The branch of agriculture that deals with the feeding, caring and breeding of domestic animals is called animal husbandry.
- The main elements of animal husbandry are
 - i Proper feeding (ii) Providing good shelter
 - (iii) Proper health (iv) Proper breeding

1. CATTLE FARMING

Cattle husbandry is done for two purposes, milk production and draught labour for agricultural work like tilling and irrigation.

Cattle feed consists of two components :

- ① **Roughage** : It contains large amount of fibre which includes hay fibre silage, fodder and legumes like barseem, lucerne and cowpea.
- ② **Concentrate** : It is a mixture of cereals like maize, oat, barley, jowar, grams, rice polish, cotton seeds, grambran, molasses and oilseed cake moistened in water. These are rich in proteins, highly palatable and easily digestible.

COMPETITION WINDOW

Livestock : All domestic useful animals.

Milch Animals : Milk giving animals.

Draught : Animals used for work and labour.

DO YOU KNOW?

- Milch breeds of indigenous cows : Gir, Sahiwal, Tharparkar.
- Milch breeds of exotic cows : Jersey, Brown-swiss.
- Cross breeds of cows : Karan-swiss, karan-fries.
- Breeds of Indian buffaloes : Murrah, Mehsana, Surti, Nagpuri.

- 2. **POULTRY** : The rearing and caring of birds for obtaining eggs and meat for the commercial purpose is known as poultry farming.

- It includes chickens (fowls), ducks, geese, turkeys, guinea-fowls, peafowls, pigeons and guails.
- The egg laying poultry birds are called egger or layer, while the one reared for obtaining meat is called chicken or broiler.

COMPETITION WINDOW

Lime stone : Helps in crushing of grains and also provide CaCO_3 to the bird which is helpful in the formation of egg shell.

- **Feeding** : They feed grains, green manure and lime stones.
- **Broody Hen** : Hen after laying eggs, sits on them for about 21 days, till the chickens hatch out. This time period is known as incubation period. During this time. the hen becomes aggressive if anyone disturbs it. It is called a broody hen.

DO YOU KNOW?

❑ BREEDS OF HENS

Indegenous Breeds : Aseel, Brhama.

Excotic Breeds : White Leghorn, Rhode Island Red.

Cross Breeds : HH260, B77.

3. **FISHERIES** : The rearing of fish on a large scale is called **pisciculture**.

- The fish eggs are introduced into small ponds called **hatcheries**.
- Fish is a rich source of proteins and oils. These are a good source of vitamin A and vitamin D.
- **Fresh water Fishes** : Catla, Rohu and Mrigal.
- **Marine Fishes** : Tuna, cod, pomfret.

- ❑ In hatcheries fries hatch out of eggs which are transferred to a larger culture pond where they get proper food, light and oxygen. The fishes are harvested when they attain the required size.

4. **APICULTURE** : The rearing of honey bees for a large scale production of honey and bee wax, is know as **apiculture**.

- Bees are reared in wooden boxes for commercial production of honey called **apiaries**.
- **Honey bee colony and social organization** :

In a colony, there are three types of bees which are structurally and functionally different from one another, so polymorphism is associated with division of labour. These types are :

- 1. **Queen bee** : Queen bee lays eggs which hatch into larvae, which grows into pupae.
- 2. **Drones bee** : Drones are smaller in size than the queen, and their function is to fertilize the queen.
- 3. **Workers bee** : Workers bees look after young ones, collect nectar and pollen from flowers and make honey.

COMPETITION WINDOW

Fishing Trawlers : Capture fish in mechanised of boats called fishing trawlers.

Fries : Small fish is called fries.

COMPETITION WINDOW

Honey : It contains water, sugar, minerals and enzymes. It is used in medicines and not as a regular food item.

Sericulture : It is the rearing of silk worm for the production of raw silk.

White revolution : This is related to increased milk production.

Father of white revolution : Dr. V. Kurien.

Silver revolution : This is related to increased egg production.

Blue revolution : This is related to increased fish production.

ANIMAL DISEASES			
	Disease	Causal organism	Animals affected
1	Foot and mouth disease	Virus	Cattle
2	Anthrax	Bacteria	Cattle
3	Ranikhet	Virus	Poultry birds
4	Fowl cholera and fowl typhoid	Bacteria	Poultry birds



OBJECTIVE TYPE QUESTIONS

1. Horticulture deals with -
 (A) Production of crops (B) Breeding of animals
 (C) Study of soil (D) Production of fruits and vegetables.
2. Which one of the following is not true about ploughing -
 (A) Loosens the soil (B) Aerates the soil
 (C) Makes the soil hard (D) Allows easy penetration of roots into the soil
3. Separating the grain from chaff is called -
 (A) Winnowing (B) Hybridisation (C) Threshing (D) Harvesting
4. Organic substances obtained from the decomposition of dead plants and animals wastes are called -
 (A) Fertiliser (B) NPK (C) Herbicide (D) Manure
5. Biological methods of pest control involve -
 (A) Spraying chemicals to kill plants (B) Killing pests by using other organisms
 (C) Spraying DDT (D) Weeding
6. Which one of the following is not a method to maintain the fertility of soil.
 (A) Crop rotation (B) Multiple cropping (C) Fallow method (D) Ploughing
7. Which one of the following can be used to prevent the disease called rust in wheat?
 (A) An insecticide (B) A rodenticide (C) A fungicide (D) A herbicide
8. Which of the following machines would you use to harvest a crop as well as to beat out the grains from the chaff?
 (A) Mechanical harvester (B) Combine
 (C) Thresher (D) Harrow
9. Denitrifying bacteria give out -
 (A) Carbon (B) Nitrogen (C) Oxygen (D) Hydrogen
10. Plants get their nitrogen from the soil as -
 (A) Nitrates (B) Nitrogen dioxide (C) Nitrogen oxide (D) Nitric acid
11. First cultivated crop plants were -
 (A) Cereal crop (B) Pulses (C) Fodder crop (D) Fibre crop
12. Transplantation is -
 (A) Process of scattering the seed.
 (B) Process of loosening and turning of soil
 (C) Process of shifting of tiny saplings from the nursery to a field
 (D) None of these
13. Which preventive measure(s) avoid use of pesticides -
 (A) Crop rotation (B) Use of pest resistant varieties of crop plant
 (C) Summer ploughing (D) All of these

14. Chemical substances which are used to kill insects -
 (A) Fungicide (B) Insecticide
 (C) Weedicide (D) All of these
15. Process of cutting of crop after its maturation -
 (A) Threshing (B) Harvesting
 (C) Winnowing (D) None of these
16. Which of the following is not a method of irrigation?
 (A) Drip irrigation (B) Sprinkler
 (C) Nursery (D) Canals
17. The unwanted wild plants growing along with the crop plants are called -
 (A) Seedlings (B) Weeds (C) Minor crops (D) Grasses
18. Vermicomposting involves -
 (A) Cockroach (B) Earthworm (C) Leech (D) Roundworm
19. The science of improving crop varieties is called -
 (A) Plant breeding (B) Hybridization (C) Selection (D) Introduction
20. Which one of the following cause(s) plant diseases?
 (A) Viruses (B) Bacteria (C) Fungi (D) All of these
21. The big pieces of soil in the ploughed field are called -
 (A) Crumbs (B) Flakes (C) Lumps (D) All of these
22. Rearing and breeding of fish in pond and tank is called -
 (A) Aquaculture (B) Fishing (C) Pisciculture (D) Apiculture
23. Broilers are maintained for getting -
 (A) Milk (B) Egg (C) Meat (D) Leather
24. Males of honey bee colony are called -
 (A) Drone (B) Workers
 (C) Soldiers (D) All of these
25. Cattle feed should contain -
 (A) Roughage (B) Concentrate (C) Both (D) None of these

						ANSWER KEY									
Que.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Ans.	D	C	A	D	B	D	C	B	B	A	A	C	D	B	B
Que.	16	17	18	19	20	21	22	23	24	25					
Ans.	C	B	B	A	D	A	C	C	A	C					

**FILL IN THE BLANKS**

- The practice of growing fruits, vegetables, flowers and ornamental plants is called
-crops require lot of water.
- crops are harvested in March-April.
-is a process to loosen soil.
-prevents the loose soil from being eroded by water or air.
- A combine machine canand
- Grains are separated from the chaff and hay by a method called,
- Shifting of tiny saplings from the nursery to a field is called.....
- The process of scattering the seeds in the soil is called.....
- Cattle may suffer from a viral disease called
- Hen, and are reared in poultry farms.
-is a marine fish, while is a freshwater fish.
- In a beehive, only lays eggs.
- Rearing, breeding and management of fish on a large scale is called.....
-are chemical substances rich in nutrients such as nitrogen, phosphorus, potassium.

**WRITE TRUE OR FALSE FOR THE FOLLOWING**

- Sowing of seeds by sprinkling them by hand is called broadcasting.
- Paddy is first grown in small plots called kindergartens.
- Earthworms are a big menace to farmers.
- Excess use of fertilizers may lead to eutrophication.
- Rice is a leguminous plant.
- Rearing of fish on large-scale is called pisciculture.
- Milch animals require roughage in their diet.
- Feed of poultry includes lime stones.
- Hatching of eggs of hen can be done artificially.
- Cattle do not suffer from bacterial diseases.

**MATCH THE FOLLOWING**

(A)

Column - A

- (i) Rice
- (j) Wheat
- (k) Sowing seeds
- (l) NPK

Column - B

- (a) Broadcasting
- (b) Fertilizers
- (c) Rabi crop
- (d) Kharif crop

(B)

Column - A

- (i) Plough
- (j) Hoe
- (k) Cultivator
- (l) Seed drill
- (m) Moat
- (n) Sickle
- (o) Sprayer
- (p) Combine

Column - B

- (a) Sowing of seeds
- (b) An irrigation system
- (c) Manual harvesting
- (d) Loosening and turning of soil
- (e) Used for spraying weedicide
- (f) Removing weeds
- (g) Combined harvester and thresher
- (h) Tractor driven tilling device.

**SHORT ANSWER TYPE QUESTIONS**

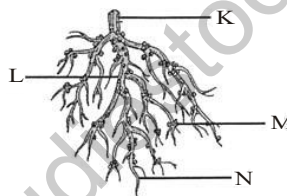
1. Define irrigation, water logging and lodging.
2. What are manures and fertilizers? Give examples.
3. Why do we need to protect crops from pathogens?
4. Why should we remove weeds from the fields?
5. Define the terms apiculture and pisciculture.
6. Name the different agriculture practices.
7. What are the two main crop seasons? Give three examples of the crops grown during each season.
8. What is a broody hen?
9. What is a hatchery?
10. How are fish cultured?

**LONG ANSWER TYPE QUESTIONS**

1. What are the differences between rabi and kharif crops? Give one example each of food items prepared from rabi and kharif crops.
2. Define irrigation. Discuss its importance and the various ways in which water is supplied to the fields.
3. What is weeding? Discuss the different methods of weeding.
4. Write differences between fertilizers and manure.
5. How are fish reared in tanks?
6. Write a paragraph in your own words on each of the following:
(a) Hoe (b) Crumbs (c) Manure (d) Harvesting
7. How is our food production or crop yield increasing day by day?
8. How is the population of insects and microorganisms controlled in stored foodgrains?
9. How are pests controlled in a crop field?
10. Why proper storage of food grains is important? How is it done?

CROP PRODUCTION & MANAGEMENT			ANSWER KEY		EXERCISE-2 (VIII) -CBSE				
● FILL IN THE BNALKS :									
1. Horticulture		2. Kharif	3. Rabi	4. Ploughing/Tilling		5. Levelling		6. Harvest, Thresh	
7. Winnowing		8. Transplantation		9. Broadcasting		10. Foot and mouth disease			
11. Duck, turkeys		12. Tuna, catla		13. Queen bee		14. Pissiculture.		15. Fertilizers	
● WRITE TRUE OR FALSE FOR THE FOLLOWING :									
1. T	2. T	3. F	4. T	5. F	6. T	7. T	8. T	9. T	10. F
● MATCH THE FOLLOWING :									
(A) (1) → d ; (2) → c ; (3) → a ; (4) → b									
(B) (1) → d ; (2) → f ; (3) → h ; (4) → a ; (5) → b ; (6) → c ; (7) → e ; (8) → g									

- Which of the following should come in the box 'X' in the given sequence ?
Ploughing → Levelling → manuring → Sowing seeds → X
(A) Broadcasting (B) Transplanting (C) Irrigation (D) Drilling
- Which of the following crops would enrich the soil with nitrogen ?
(A) Apple (B) Pea (C) Paddy (D) Potato
- Eutrophication means :
(A) toxication of water by fertilisers (B) decrease the growth of algae
(C) increase in the fertility of the soil (D) all of the above
- Besides carbon, hydrogen and oxygen, the synthesis of proteins by plants require :-
I Magnesium II. Nitrogen III. Potassium
(A) I only (B) III only (C) II only (D) II and III only
- Nitrogen-fixing bacteria can be found in :-
I the soil II. root nodules III. leaves
(A) I only (B) I and II only (C) II and III only (D) I, II and III
- Which of the following crops seedlings need to be transplanted ?
(A) Wheat (B) Potato (C) Mustard (D) Rice
- Identify the correct sequence in farming :-
(A) Sowing → tilling → irrigation → manuring (B) Sowing → tilling → manuring → irrigation
(C) Tilling → sowing → irrigation → manuring (D) Tilling → sowing → manuring → irrigation
- Which of the following parts have bacteria in the figure given below ?



- (A) K (B) L (C) M (D) N
- Grain stocked for emergencies is called :-
(A) surplus stock (B) storage (C) buffer stock (D) regular
- The crop that requires more irrigation is :-
(A) wheat (B) rice (C) maize (D) jowar
- Operation flood is otherwise called :-
(A) green revolution (B) white revolution (C) black revolution (D) yellow revolution
- Match the following with correct answers :-
a Kharif crops I Wheat
b Rabi crops II Ploughing
c Tilling III Harvesting
d Combine IV. Paddy
(A) a - I, b - II, c - III, d - IV (B) a - IV, b - I, c - II, d - III
(C) a - IV, b - III, c - II, d - I (D) a - III, b - IV, c - I, d - II
- To prevent seed-borne diseases the seeds must be :-
(A) sown at right depth (B) spaced at right depth
(C) sown in highly wet soil (D) treated with fungicide solutions

ANSWER KEY													
Que.	1	2	3	4	5	6	7	8	9	10	11	12	13
Ans.	C	D	A	C	B	D	D	C	C	B	B	B	D