

# I.B.Patel English School

(Primary Section)

## Chapter 1

# Crop Production and Management



## What are Crops ?

Crop is a plant of the same kind that is grown on a large scale to get useful products and to meet nutritional needs in an area by man.

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*The plants which are grown at home or on small scale of area are not said to be crops.*

### Types of Crops

There are different types of crops which are as follows:

- 1.Kharif crops
- 2.Rabi crops
- 3.Zaid

## Kharif crops

These are the crops grown in rainy season during the month of June to October. They are also known as summer or monsoon crop. Seeds of these crops are sown in the beginning of the monsoon season. They are harvested by September or October.

For example: Maize, sugarcane, soybean, groundnut and paddy.

## **Rabi crops**

These crops are sown in winter that is between November and December. These are known as winter crops. These crops are harvested in March or April. For example: Wheat and Barley. These crops require less water to grow.

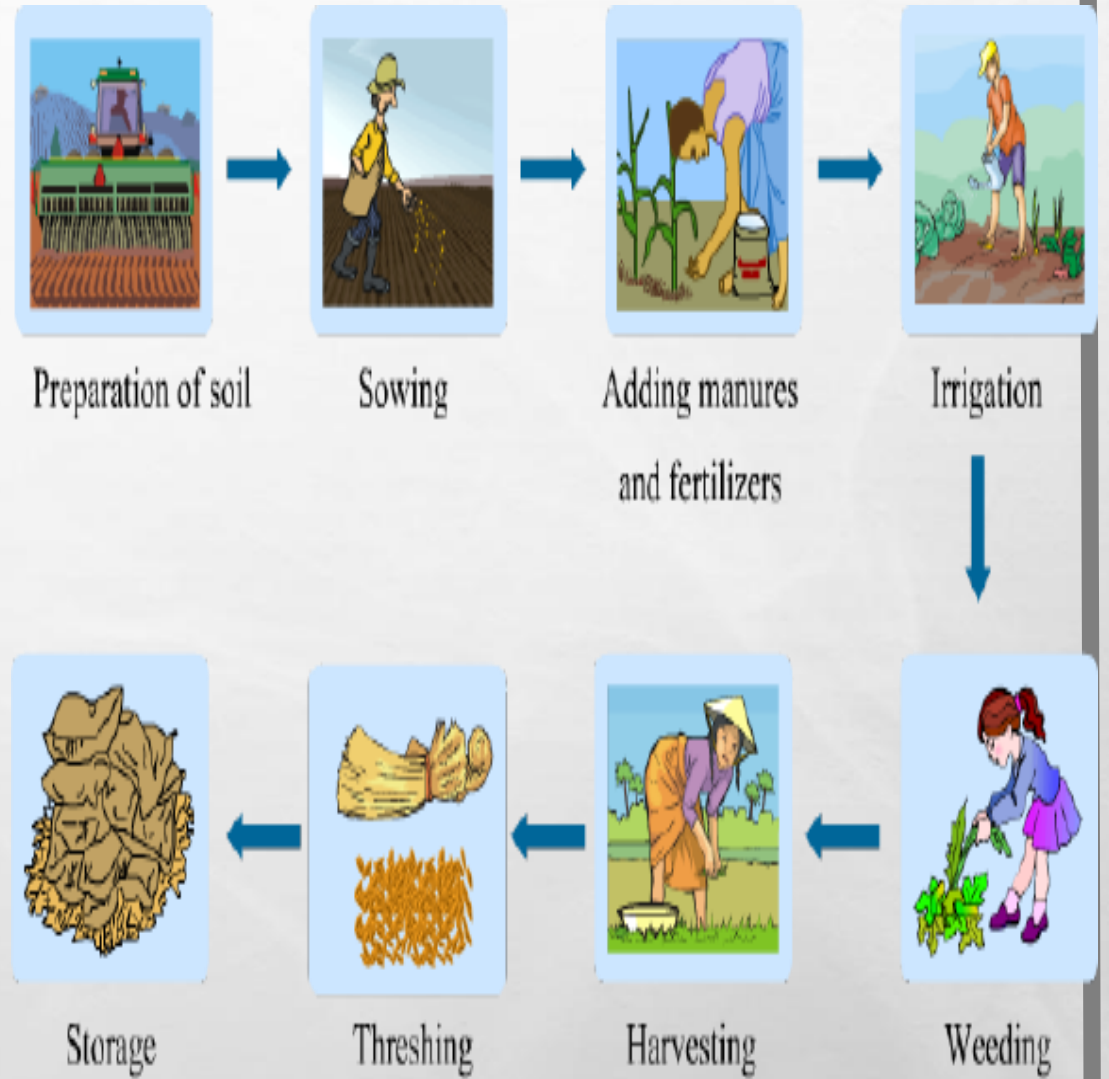
## **Zaid crops**

These crops are sown in summer seasons and are known as summer crops. For example: watermelon and cucumber. These crops require excessive heat to grow.

# Agriculture practices

There are different practices which are used and these are as follows:

1. Preparation of soil
2. Sowing
3. Apply manures and fertilizers
4. Irrigation
5. Weeding
6. Protection of crops
7. Harvesting, Threshing, and Winnowing
8. Storage





## Preparation of soil

It involves ploughing, leveling, and manuring.

Ploughing is defined as turning and loosening of soil with a plough.



## Advantages of ploughing

1. It helps in the penetration of roots deeply.
2. Soil gets loose by ploughing and therefore, air can pass through it. So, we can say that it aerates the root.
3. It is helpful in removing unwanted plants or weeds.
4. It is helpful in mixing or upturning of soil.
5. It is helpful in destroying harmful organisms.

# HOE (tool)

is used to move small amounts of soil to agitate the surface of the soil around plants, to pile soil around the base of plants, to create narrow furrows and shallow trenches for planting seeds and bulbs



# PLOUGH

is used in farming for initial cultivation of soil in preparation for sowing seed or planting to loosen or turn the soil



The traditional way: a farmer works the land with horses and plough.

Wooden Plough :



Iron Plough:



## Leveling

After ploughing, certain lumps are left. Then, leveling helps in breaking of big lumps of soil. It is done by a leveler.

## Advantages of leveling

- 1.It is helpful in protection of soil from erosion.
- 2.It promotes irrigation.

## Manuring

It is defined as mixing of soil with manure. It is helpful in increasing soil fertility.

**Fertility means soil has sufficient nutrients.**





Cultivator

Seed Drill



# Sowing

**It is defined as process of putting seeds in soil.**

Seeds are selected on the basis of:

- High yielding variety (HYV) seed is used.
- Seeds should be germinated in nature and germinated in plant. It should not be dormant and it means the seeds which is not converted into plant.
- Seeds should be sown at right depth.
- There should be a proper distance maintained between each seed. Overcrowding should be avoided.
- Seeds should be free from diseases.
- Seeds used should be viable means it should be converted into plant.

## Methods of sowing

There are different methods of sowing which are explained as follows:

### Broad Casting

It is a method in which seeds are sown manually directly by scattering in soil. Disadvantage of this method is that it leads to unequal distribution of seeds and thereby reduces crop yield.

### Seed drill

In a seed drill, an iron funnel is placed at the top. Seeds are put in the funnel and then released in soil furrows. The advantage of this method is that it saves time and seeds are sown at right depth.

### Transplantation

In this method, seeds are sown first in nurseries, and then the seedlings are transferred to the main field. For example: Paddy.

## **Manures and Fertilizers**

They both play an important role in the production of healthy growth. These are added to the soil to maintain the fertility of soil.

Fertile soil is defined as the soil which has all the nutrients required for the growth of seeds.



## Manures

These are the organic substances obtained by the decomposition of plants and animals waste.

### Types of Manures

#### **Farm yard**

It consists of cattle dung and urine.

#### **Compost**

It is formed by the decomposition of plants and animals. If decomposition can be done in the presence of earth worm, it is known as vermicompost.

If decomposition is done in the presence of bacteria, then it is known as bacterial compost.

#### **Green manure**

It consists of decomposed leguminous plants like sunhemp. Leguminous plants are the plants whose roots have special bacteria and that bacteria is helpful in nitrogen fixation.

## Advantages of Manure

The advantages of manure are as follows –

- ✓ It adds nutrient to soil.
- ✓ It adds humus to soil.
- ✓ It improves the quality of soil.

## Fertilizers

These are the inorganic compounds which supply specific nutrients.

For example: NPK (Nitrogen Phosphorous Potassium), ammonium sulphate, ammonium phosphate etc.

<b>Manure</b>	<b>Fertilizer</b>
It is a organic substance.	It is it is an inorganic substance.
It provides all the essential nutrients to the soil.	It provides all the required or specific nutrients to the soil.
Its action is slow.	Its action is fast.
Manure adds humus to the soil.	It does not add humus to soil.
Manure is required in very large number.	It is required in small numbers.
Manure takes long period of time to show result.	It shows result in very less period of time.
Manure is difficult to store and transport.	FertiFertilizers are easy to store and transport.
Manure is biodegradable.	Fertilizer is non-biodegradable.
It is prepared in fields.	It is prepared in laboratories.

## Irrigation

It is supplying water to plants.

### Sources of irrigation

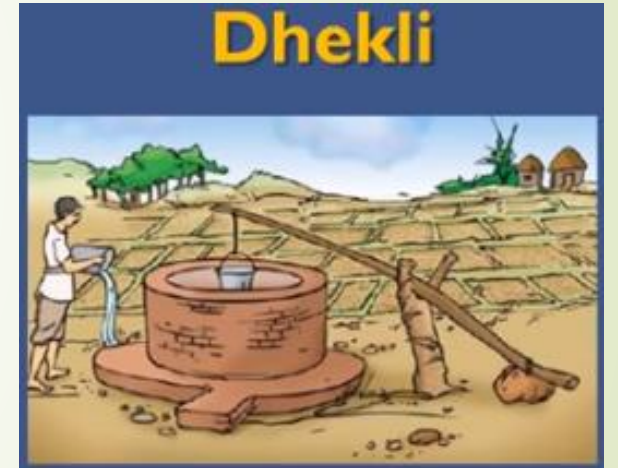
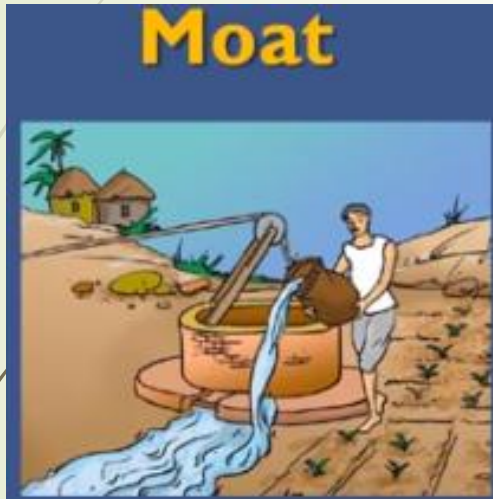
Water can be obtained from pond, lake, tube well.





# Traditional method of Irrigation

**Moat:** Water is pulled out from the well and directly supplied to the plants.

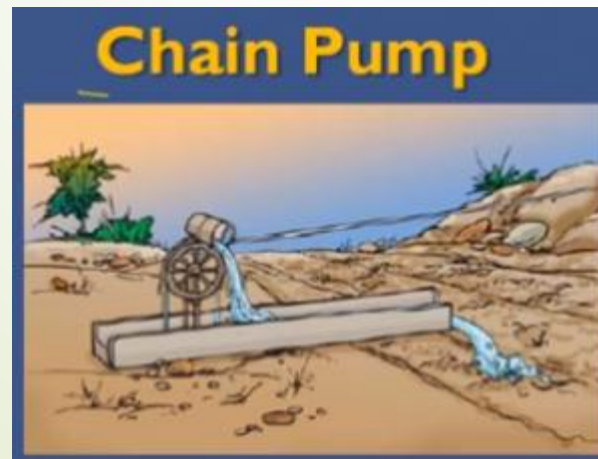


**Dhekli:** In dhekli, buckets are used and then with the help of rope, water is pulled out from the well.

**Rahat:** In this method, buckets are knotted with rope on wheel and then bulls rotate the handle due to which wheel turned up and then water gets filled into the bucket and used for different purposes.



**Chain pump:** In this method, two wheels are used. The one wheel is easily visible and the another wheel at the bottom is slightly dipped into the soil. These two wheels are connected with each other through chain and buckets are joined with wheel. When wheels rotate buckets get filled and used for different purposes.



# Modern methods of irrigation: Sprinkler



In this method, water is distributed through a system of perpendicular pipes usually by pumping.

It is then sprayed into the air over entire soil surface through spray heads on rotating nozzles so that it breaks up into small water drops which fall to the ground. This system provides efficient coverage for small to large areas and is suitable for use on all types of soil. This method of supplying water is similar to rainfall.

# Modern methods of irrigation: Drip Irrigation



In this system, water falls drop by drop just at the position of roots. Drip Irrigation also called trickle irrigation.

A drip irrigation system carries water directly to the base of each individual plant. Water is allowed to fall drop by drop from a pipe, just near the roots. It is an ideal watering method. It saves water. It also reduces soil erosion. Water and nutrients reach directly to the places where needed. It saves time and labour.



## Chain Pump



## Moat



## Rahat



### Uses

It is helpful in translocation of food.

It protects the crops from frost and hot climate.

### Disadvantages of excess irrigation

Due to excess irrigation seeds can't respire.

Due to excess irrigation roots do not grow well



✓ **Drip**

## Dhekli



**Sprinkler**

## Weeds

Weeds are the unwanted plants that grow with the main plant. The process of removing weeds is called weeding. For example: Amaranthus, grass, wild oats, Chenopodium (Bathua) .



## Disadvantages of weeds

Weeds compete with main crops for nutrients, space, sunlight, water etc. Due to weeds, main crop gets affected.



## Methods of weeding

**Manual weeding:** It is the method in which weeding is done by hands. This process is time consuming.



**Weedicides:** These are the chemicals that are used to kill weeds. For example: 2-4 D etc. In this methods we spray the chemicals.

## Protection of crops

Crops are protected from pests

Pests are the organisms that damage crops.

For example: Insects, bacteria etc.

Pests affect crops in various ways as follows-

- 1. They lower the quality of crops.**
- 2. They reduce yield.**
- 3. They bore inside the crops.**

**Pests are removed by pesticides. Pesticides are the chemicals that kill pests. For example: DDT.BHC and Malathion etc.**



# Harvesting

The process of cutting and gathering mature crops from the field with sickle is called harvesting.

## Methods of Harvesting

The different methods of harvesting are as follows –

### Threshing

It is the process of separating grain from hay. After harvesting, threshing is done. It is the process of loosening the seeds from the husk and straw. **In olden times, this was done by beating the grains with sticks or some other objects.**



# Winnowing

It is the process of separating chaff from grains.

# Storage

If storage is not done in well maintained order, our crops get destroyed.

## Methods Employed for storage

**Drying:** Seeds can be stored by drying as by doing this, moisture gets removed and it prevents the growth of microorganisms.

## Maintaining storage containers

Gunny bags, earthen pots, etc should not be used repeatedly. It should always be new, without cracks etc. By doing this, microorganisms will not grow and seeds can be saved for a longer period of time.

## Chemical treatment

Godowns, etc. should be sprayed with fumigants and there should be no seepage so that crops can be stored properly. If water is present in godowns, it may lead to formation of microorganisms and these microorganisms might spread diseases. Thus, it can harm storage.

## Uses of improved storage structures

The storage structures that are airtight, rat proof, can maintain steady temperature etc should be used. For example: silos.

### Advantages of storage

1. Food does not get spoiled.
2. It is helpful in availability of fruits & vegetable whole year.
3. It is also helpful in maintenance of emergency stock like during flood.

### Storage

#### ➤ **Dry storage**

There are certain seeds that need dry storage. For example: Food grain etc.

#### ➤ **Cold storage**

There are certain seeds that need cold temperature for its storage. For example: Fruits including apples, banana, pear etc.

## Crop rotation

**Method of growing crops alternatively on same land is known as crop rotation.**

For example: Cauliflower is sown and harvested. Let us suppose cauliflower used nitrogen from soil. It means that the soil has less nitrogen and then we need to grow that crop which has high nitrogen and does not require nitrogen for its growth.

### Crop rotation has a lot of benefits

- 1. The land gets utilized in a better way.**
- 2. Soil fertility is maintained.**
- 3. Farmer has variety of crops for selling.**





## Example of crop rotation

Legumes include pea, beans, grams and pulses are grown in first season and wheat should be grown next to it. In roots of legumes, rhizobium (bacteria) is present and this rhizobium is helpful in fixing of atmospheric nitrogen. It means that it converted it into nitrogen compound and add it in the soil. Thus, soil will have not nitrogen deficiency. Then wheat should be sown and requires nitrogen. Then, again we can grow legumes to maintain nitrogen level in soil.

The legume crops (has nitrogen fixing bacteria) uses up different nutrients from the soil but it fixes atmospheric nitrogen and makes the soil richer in nitrogen and maintain the fertility of soil.

## Multiple cropping

Method of growing two or more types of crops in same field is called multiple cropping.

## Criteria of selecting crops

Crops with different maturation period are chosen. The crop which gets mature first will be harvested first and then the crop that will mature later will be harvested accordingly. For example: sugarcane, legumes.

## Problems faced by farmers

1. Difficulty in harvesting.
2. Difficulty in supplying fertilizers.
3. Can spread pest.
4. Can lower the quality of crops.

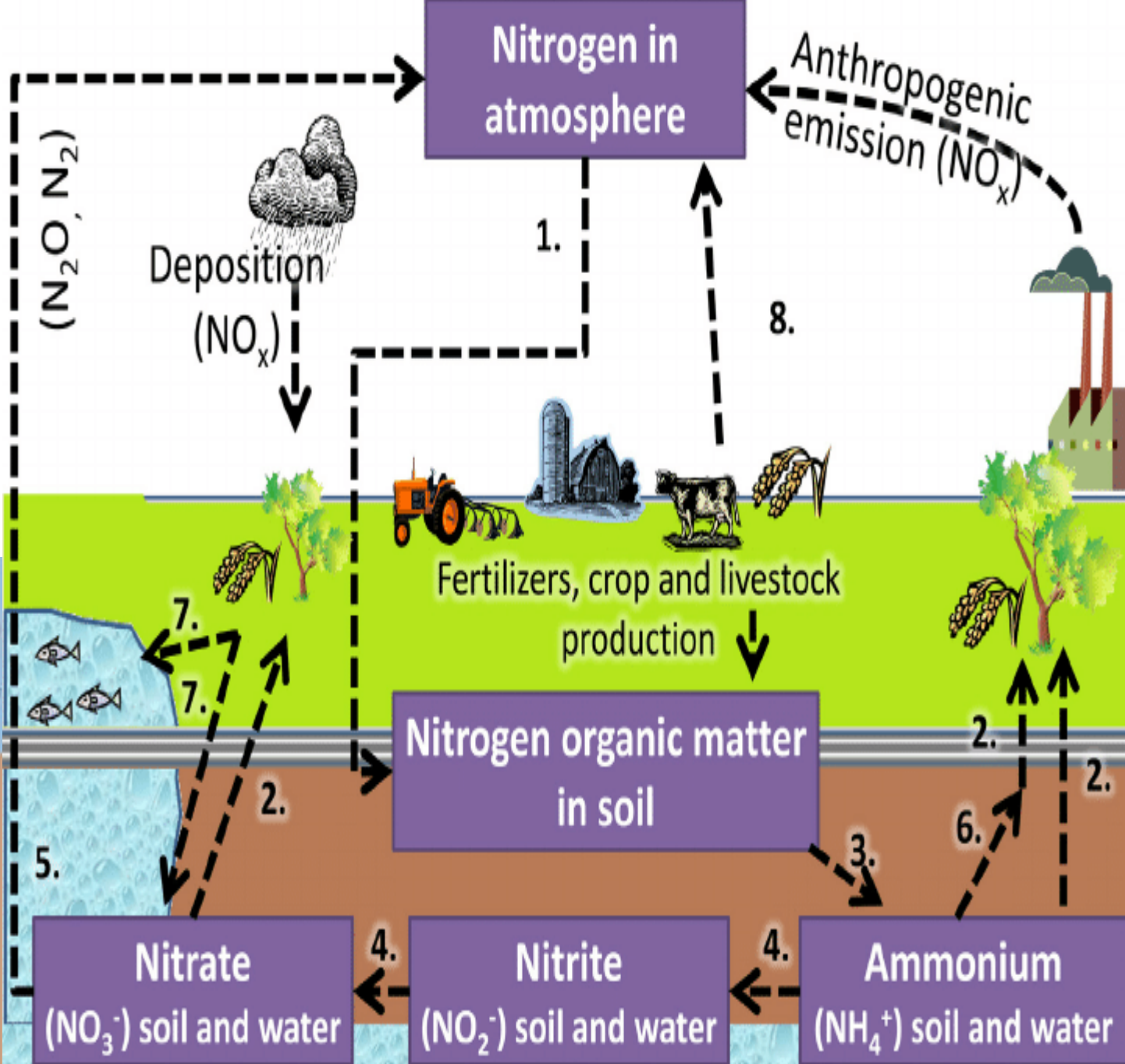
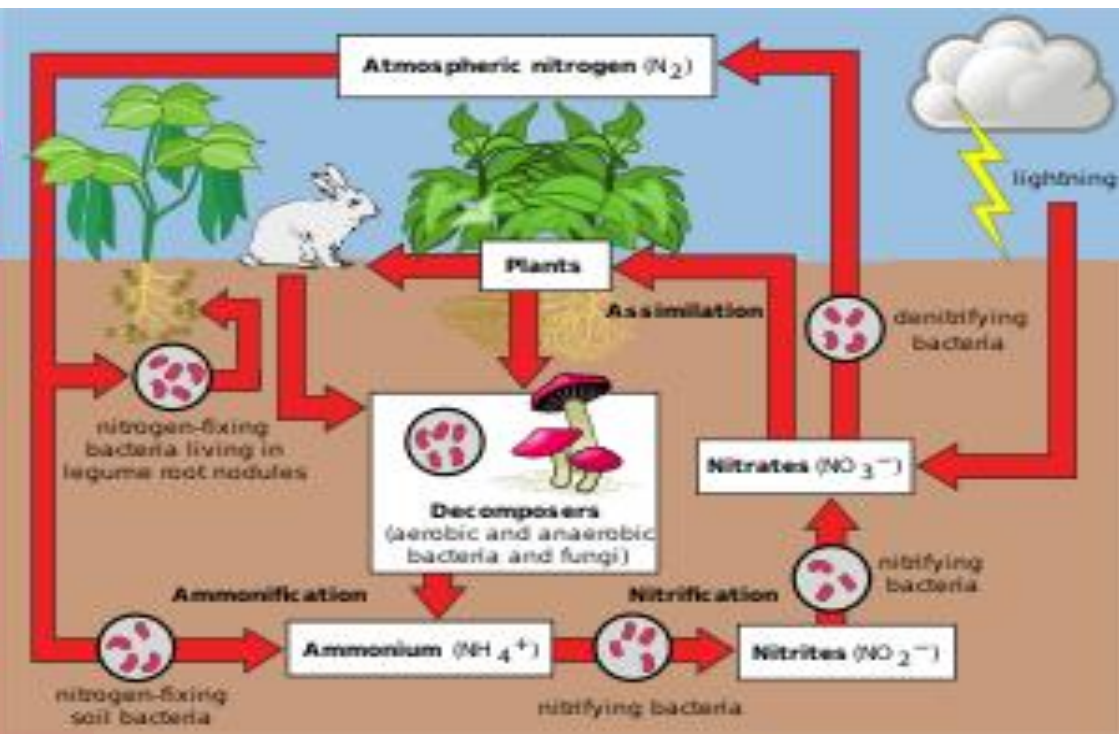
**For better results: Multiple cropping can be converted into intercropping.**

Intercropping is defined as growing different crops in definite pattern. For example: By making rows. By this method, pest will not spread and easy to harvest.

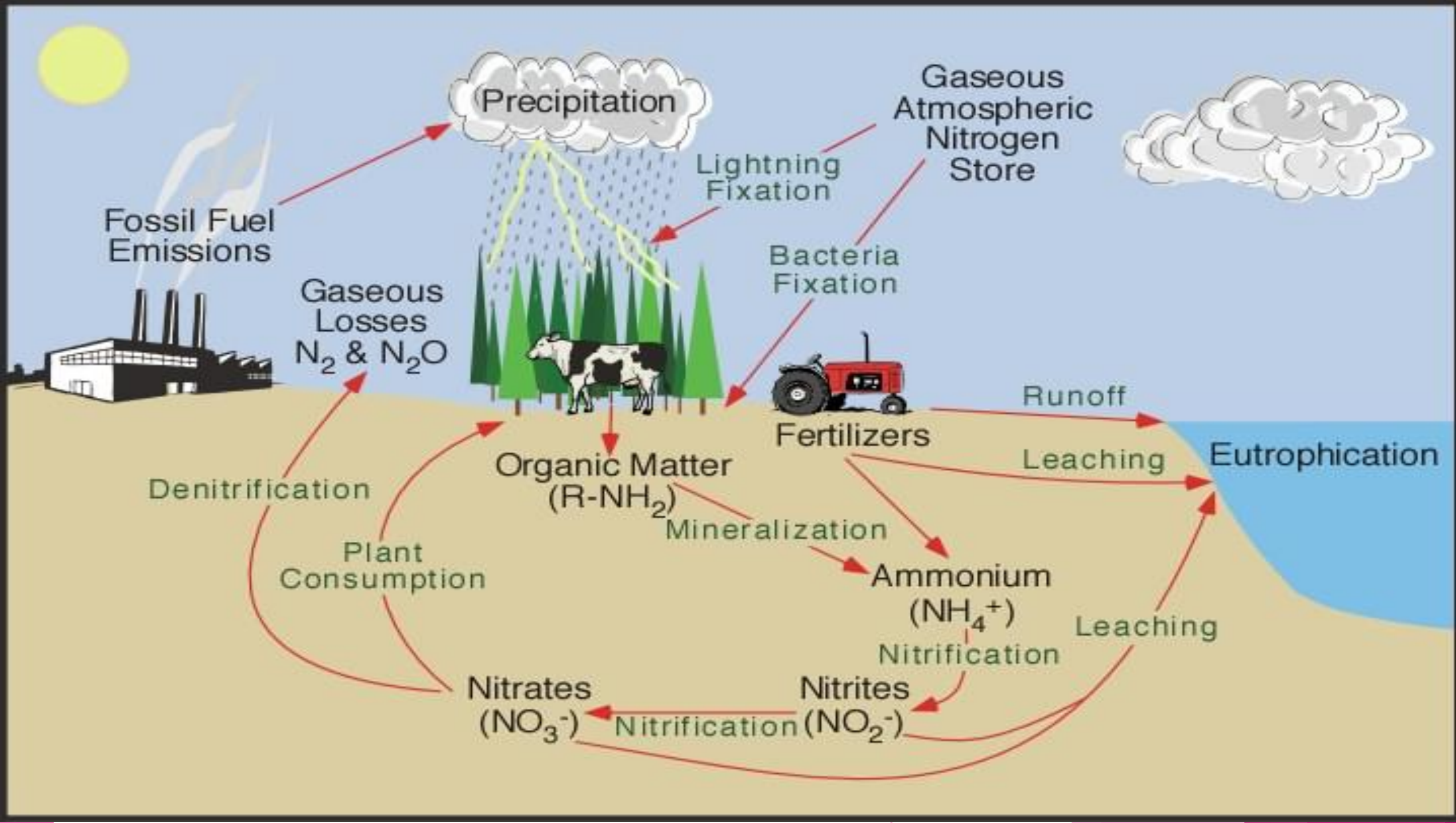
All limitations of multiple cropping are overcome by intercropping.

# Nitrogen Cycle

It is the process by which nitrogen is converted to its various chemical forms. This transformation can be carried out through both biological and physical processes. Important processes in the nitrogen cycle include—









✓ **Nitrogen Fixation:** The conversion of nitrogen into nitrates is known as nitrogen fixation.

✓ **Nitrate Assimilation:** Plants absorb nitrates from the soil through their root system and convert them into plant proteins. When animals eat these plants, the plant proteins are converted into animal proteins.

✓ **Ammonification:** The process of conversion of plant and animal proteins into ammonium compounds by putrefying bacteria in soil is called ammonification.

✓ **Nitrification:** The ammonium salts are converted into nitrites by Nitrosomonas bacteria. The nitrites are then converted into nitrates by Nitro bacteria. This process is called nitrification.

✓ **Denitrification:** The conversion of nitrates into free nitrogen gas by denitrifying bacteria (Pseudomonas bacteria) is called denitrification.

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# Thank You