5. Irrigation: watering of crop plants is called irrigation. The major source of water is rainfall.

1. Water is important for the proper growth and development of flowers, fruits and seeds of plants.
2. Water is absorbed by the roots. Along with water, minerals and fertilisers are also absorbed.
3. Water is essential for germination of seeds.
4. Water is essential for carrying out the produce of photosynthesis to make food.
5. Water dissolves nutrients which a transported to each part of the plant.

Traditional method: Canal irrigation, furrow irrigation, chain pump, moat, dhekli, and rahat are some of the traditional methods of irrigation. These methods are cheaper, but often lead to wastage of water.

Modern methods: Sprinkler irrigation and drip irrigation are examples of modern methods of irrigation. These methods help in saving water. Care must be taken not to water the field excessively. Excess water on the field may cause a condition called water logging, which may harm the crop by:

- Decreasing the amount of air available to the roots and
- Leading to an increase in the salt content of the soil.

Sprinkler system: In sprinkler system, water sprayed on the plants using sprinklers for the perpendicular pipes having rotating nozzles on top are called sprinklers.

6. **Protection of Crops**: pests are those organisms which damage crops and make them unfit for human consumption. The most common pests are insects, rats, rabbits and birds. Microbes like bacteria, fungi and viruses also cause diseases to crop plants. Some chemicals called 'pesticides' are sprayed on crops to destroy pests. Birds can be scared away from the filed by installing scare crows.

7. **Harvesting, Threshing and Winnowing:** Once the crops mature, it is harvested. The process of cutting and gathering a crop is known as **harvesting**. It is done either manually by means of sickles or by some other mechanical means by using a harvester. Pongal, Baisakhi, Holi, Diwali are the special festivals associated with harvesting and are celebrated with great joy. The whole process of separation of grains from the harvested crop is known as **threshing**. Threshing can be done manually or using the machine- thresher or combine. The process of separating the grains from the chaff with the help of wind is called **winnowing.** The stem is cut into small pieces, stored as hay in haystacks and fed to cattle as food. Hay which is given to cattle is called **'fodder'**.

8. **Storage:** Harvesting grains need to be stored before they are made available for consumption. The grains are dried in the sun to remove as much moisture as possible. They are then weighed and packed in gunny bags or bins. Bulk storage of grains is done in granaries and silos. The storage area should be kept clean and dry.

Improvement of Crops: The period of 1960 – 1980 is called as the Golden era. India became self sufficient in food grains. In India, there are two main seasons for cultivating crops: rabi and kharif. **Kharif crop** are generally planted in June and harvested in October. Rice, maize, cotton. **Rabi crop** are generally planted in November and harvested in April. Wheat, barley, Pea, and gram are example of Rabi crop. Factors responsible for increased production of crops:

1. Use of improved seeds/ crops developed by plant breeding.

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2. Improvement in soil fertility by using fertilisers.
3. Protection of plants from pests by using pesticides.
4. Control of plant diseases.
5. Better storage facilities.

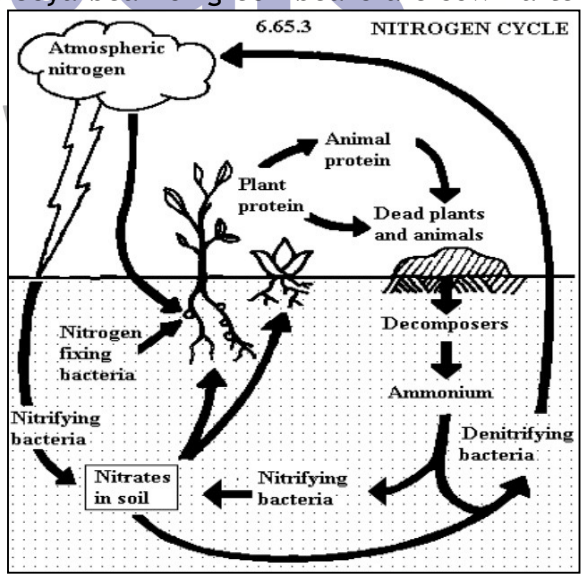
Plant breeding is a technique through which scientists control the reproduction in plants to get the desired offspring.

Hybridisation is a technique used for developing new varieties of crops by cross-breeding two different varieties. A single variety of plant species does not posses all the useful characters. The new variety (hybrid) contains the desired characteristics of both the parents.

Green Revolution: here has been tremendous increase in the production of wheat crop in India during 1960 - 1980. This is called Green Revolution. It has made our country self-sufficient in food grain production and has improved the condition of farmers. Green Revolution brought about by importing high-yielding varieties of wheat from Mexico. Similarly, high-yielding varieties of rice, bajra, sugar cane, etc., were also developed Indian scientists through cross- breeding.

Mixed cultivation: It this type of cultivation, two or more different types of crops are sown in a particular field at the same time. The crops chosen are such that the nutrient needs of one crop are fulfilled by the other. For example, a leguminous plant like pea can be grown in the same field, along with a cereal like wheat.

Crop rotation: The practice of growing two or more dissimilar crops in the same field, one after the other is called crop rotation. This is done keeping in mind the nutrient requirements of a particular crop. For example, crops like wheat and paddy use up a lot of nitrogen from the soil. This lost nitrogen can be replaced naturally if leguminous plants like pea, Soya bean or green beans are sown after wheat or paddy.



Nitrogen Cycle: Air contains 78% nitrogen in atmosphere. Water bodies also contain nitrogen. Nitrogen is an essential componenet of proteins, Vitamins and nucleic acids present in all living things. It is a natural cyclic in which atmospheric nitrogen enters the soil and becomes a part of living organisms, organisms, before returning to the atmosphere. It has three steps:

Nitrogen Fixation: Nitrogen fixation is the process by which free atmospheric nitrogen is converted into nitrogen compounds. It is of two types:

a. Atmospheric Nitrogen Fixation: during lightning in the sky when temperature is high, the nitrogen gas present in the atmosphere reacts with oxygen to produce oxides of nitrogen which bets dissolved in rainwater to form nitric acids.

b. Biological Nitrogen Fixation: atmospheric nitrogen is converted into nitrogen compounds by living organisms. Nitrogen fixing bacteria like Rhizobium and

LEARNING WITH INNOVATION....

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Clostridium which lives in the root nodules of leguminous plants converts atmospheric nitrogen into nitrates.

1. **Nitrogen assimilation:** the conversion of inorganic compounds into organic compounds is called nitrogen assimilation. The plants absorb nitrogenous compound from the soil and water and convert them into plant proteins.
2. **Dentrification:** the conversion of nitrate salt which is present in the soil to free nitrogen gas is called Dentrification. It is carried out in the soil by bacteria called Psedomonas.

Animal Husbandry: Man domesticates animals for specific purpose. All domesticated animals used by man are called livestock. Steps needed to be considered in animal husbandry are:

1. Breeding: the method of producing animals with desired characteristics. Through breeding, we can get high meat and milk yielding animals by selective breeding.
2. Feeding: animals have to be fed with balanced diet for their healthy growth and development.
3. Weeding: elimination of harmful and undesirable characteristics for next generation.
4. Heeding and Caring: the proper care and management of animals to ensure their better health.

Cattle: cows, buffaloes and bullocks are known as cattle. Use of cattle:

1. Cows and buffaloes provide milk and other dairy products.
2. Bullocks are used in agricultural practices such as ploughing.
3. Cow dung is a very good source of manure and 'Gober Gas'.

Poultry: Poultry farming or rearing of poultry birds like hen, chicken etc is done in poultry farms.

1. These birds are reared for meat and eggs.
2. Poultry products are rich source of animal fats, proteins.
3. Poultry birds breed faster.

Egg: hen starts laying egg at the age of six months. The egg laying bird is known as 'broody hen'. The egg has a yellow part in the centre called 'yolk' and is rich in fast and lipids. The white portion is rich in proteins called 'albumin'. The egg shell is made up of calcium carbonate.

Fishery: fish is a very rich source of proteins and is easily available. Oil obtained from some fishes are rich in Vitamin A and D. Rearing and management of fishes for large scale production is called 'pisciculture'. India is rich in both fresh water and marine fishes.

Honeybees: they provide us two important substances honey and wax. Since these bees provide us honey they are named as honeybees. In large scale, it is done by keeping the bees in large artificial beehives in apiaries. Honeybees suck nectar of flowers and keep it in their beehives. Honey is used for:

1. Preparing Ayurvedic drugs. Antiseptic in ointments.
2. Enzyme present in the honey helps in digestion
3. Beewax is used for making cosmetics, ointments etc.
4. The practice of rearing honeybees for honey is known as 'apiculture.'

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