



CLASS 9th NOTES
SCIENCE

IMPROVEMENT IN FOOD RESOURCES

PRASHANT KIRAD

Improvement in Food resources

All living organisms need food to survive.

Food supplies proteins, carbohydrates, fats, vitamins, and minerals, which we require for body development, growth and health.

The need for food is increasing with the rapidly increasing population of India.



We need sustainable agricultural practices and animal husbandry as it is important to increase food production without degrading the environment.

Crop season

Different crops require different climate conditions temperatures and photoperiods for their growth and completion of their life cycle.

The crops grown in the rainy season (the kharif season, from June to October) are called kharif crops.

Example: Paddy, soybean, pigeon pea, maize, cotton, green gram and black gram are kharif crops.

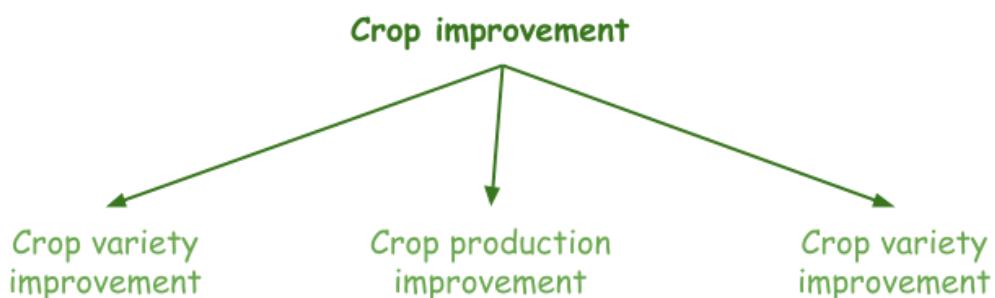


The crops which are grown in winter season (the rabi season, from November to April) are called rabi crops.



Practice of farming involve 3 stages

- Choosing the seeds to be planted
- Different nutrition techniques
- Protection of the growing and harvested crops from loss



A. Crop variety improvement

It can be done by the following factors:



- Good and healthy seeds.
- Hybridization (the process of crossing between two or more genetically dissimilar plants to produce a new variety with good properties of both crops)

Factors for which variety improvement is done:

- **Higher yield:** To increase the productivity of the crop per acre.
- **Improved quality:** The quality of crops varies from crop to crop.
- **Biotic and abiotic resistance:** Biotic factors are diseases, insects, and nematodes while abiotic factors are drought, salinity, waterlogging, heat, cold, and frost which affect crop productivity. Varieties resistant to these factors (stresses) can be improved to increase crop production.
- **Wider adaptability:** It allows the crops to be grown under different climatic conditions in different areas
- **Desirable agronomic characteristics:** Crops that contain desired agronomic traits (height, branching, leaves), set high production.
- **Change in maturity duration:** Shorter the duration of the crop from sowing to harvesting, the more economical is the variety.

B. Crop production improvement

It involves different practices carried out by farmers to achieve higher standards of crop production.

These practices are:

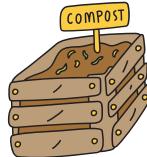
1. Nutrient management

Like other organisms, plants also require some elements called nutrients for their growth.

Source	Nutrients
Air	Carbon, oxygen
Water	Hydrogen, oxygen
Soil	Macro-nutrients (six) Nitrogen, phosphorus, potassium, calcium, magnesium, sulphur Micro-nutrients (seven) Iron, manganese, boron, zinc, copper, molybdenum, chlorine

Manure

- It is a source of organic matter.
- It supplies small quantities of nutrients to the soil.
- It is prepared by the decomposition of animal excreta and plant waste.



Various forms of manures:

- Compost:** Farm waste material such as livestock excreta (cow dung etc.), vegetable waste, animal refuse, domestic waste, sewage waste, straw, eradicated weeds, etc.
- Vermicompost:** The compost that is made by the decomposition of plant and animal waste with the help of earthworms worms is called vermicompost.
- Green manure:** Before sowing the crop seeds, some plants like sun hemp or guar are grown and then mulched by plowing them into the soil. These green plants thus turn into green manure which helps in enriching the soil in nitrogen and phosphorus.

Fertilizers

Fertilizers are commercially produced plant nutrients. Fertilizers supply nitrogen, phosphorus, and potassium. They are used to ensure good vegetative growth (leaves, branches, and flowers), giving rise to healthy plants.

Manure	Fertilizer
1. It consists of organic matter 2. Prepared from animal excreta and plant waste 3. Its use causes no pollution	It consists of inorganic matter It is prepared commercially from chemicals It causes pollution in soil and water.



2. Irrigation

- Ensuring that the crop gets water at the right stages during their growing season, can increase the expected yield of a crop.
- Water for irrigation is used from different sources that are Wells, canals, rivers and tanks.



Wells

There are two types of wells namely dug wells and tube wells. Dug wells collect water from water-bearing strata whereas tube wells can trap water from the deeper strata.



Canals

Canals receive water from one or more reservoirs or rivers.

River lift system

Water is directly taken from rivers through pumps. This system is useful for irrigation in areas close to rivers.

Tanks

These are small storage reservoirs.

Rainwater harvesting

It is an accumulation of water in tanks for later use. This also prevents soil erosion.

3. Cropping patterns

It includes different ways of growing crops to get the maximum benefit. These different ways include the following:

Mixed cropping: Growing two or more crops simultaneously on the same piece of land, for example, wheat + gram, wheat + mustard, or groundnut + sunflower. This reduces disease risk and gives some insurance against the failure of one of the crops.

Inter-cropping: Growing two or more crops simultaneously on the same field in a definite pattern. A few rows of one crop alternate with a few rows of a second crop, for example, soybean + maize.

- The crops are selected such that their nutrient requirements are different.
- This ensures maximum utilization of the nutrients supplied and also prevents pests and diseases from spreading to all the plants belonging to one crop in a field.

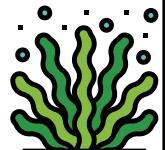
Mixed cropping: Growing of different crops on a piece of land in a pre-planned succession is known as crop rotation.

- Depending upon the duration, crop rotation is done for different crop combinations.
- The availability of moisture and irrigation facilities decide the choice of the crop to be cultivated after one harvest.
- If crop rotation is done properly then two or three crops can be grown in a year with a good harvest.

C. Crop protection improvement

- Field crops are infected by many weeds, insects, pests, and diseases.
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a. Pest control during growth: If weeds and pests are not controlled at the appropriate time, then they can damage the crop so much that most of the crop is lost.



- **Weeds:** Unwanted plants in the cultivated field. They take up nutrients and reduce the growth of the crop.
- **Insects:** Insects can harm plants by cutting the root, stem, and, leaf. They also suck cell sap from various parts of the plant.
- **Pathogens:** Organisms such as bacteria, fungi, and viruses diseases in plants in plants are called pathogens.

b. Storage of grains: For getting seasonal food throughout the year, they are stored in safe storage. However, during the storage of grains, they can be destroyed and wasted by various means.

- **Biotic problem:** Due to living organisms like insects, birds, mites, bacteria, and fungi.
- **Abiotic problem:** Due to non-living factors such as moisture, inappropriate temperature, etc.

Organic farming

A farming system with minimal or no use of chemicals as fertilizers, herbicides, pesticides, etc., and with a maximum input of organic manures, recycled farm wastes, use of bio-agents such as neem leaves or turmeric specifically in grain storage as bio-pesticides with healthy cropping systems

Animal husbandry

It is the scientific management of domestic animals efficiently to obtain food and other useful products from them.

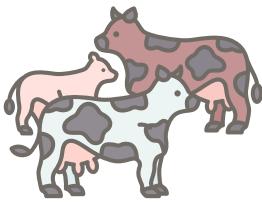


Cattle farming: The purpose of cattle farming is:

- For getting milk
- Ploughing fields
- Bull cart for transportation

Types of cattle:

Cow (*Bos indicus*)



Buffalo (*Bubalus*)

Milch animals: Milk-producing animals(female)

Draught animals: Animals that do not produce milk and are used for agricultural work.

Lactation periods - The period of milk production between the birth of a young one and the next pregnancy is called the lactation period.
The lactation period can be increased by **Cross-breeding**.

Care of cattle:

a. Cleanliness

- Roofed shelter with good ventilation for protection from rain, heat, and cold.
- Regular brushing of the skin of cattle.
- Sloping floor for shelter to avoid water-logging.

b. Food

- Roughage mainly containing fiber.
- Concentrates containing proteins.
- Food containing micronutrients (vitamins and minerals) for enhanced milk production.

Diseases: They can cause death and reduce milk production.

- Parasites are small organisms living inside or outside the body of another organism.
- They derive food from body of host.

- External parasites on the skin of cattle cause skin diseases.
- Internal parasites like worms cause stomach and intestine problems and flukes cause liver problems.

Poultry farming

It is done for eggs and meat. They both provide protein to our diet.

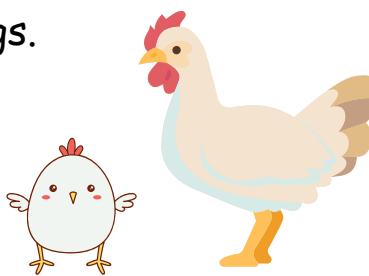
Broilers: Birds grown for obtaining meat. They can be used after 6-8 weeks from their birth.

Layers: Birds grown for obtaining eggs. They can be used after 20 weeks when sexual maturity has been attempted to lay eggs.

Most of the broilers and layers are cross-breed.

Reasons for cross-breeding:

- More and better quality chicks.
- Low maintenance.
- Breeding is done to produce dwarf broilers (meat-giving birds). Feeding costs are the biggest expense in poultry farms and as dwarf boilers need less food it can reduce cost by 30%.



Management practices in Poultry farms:

- Maintenance of temperature and hygienic conditions in housing and poultry feed.
- Prevention and control of diseases and pests.
- Proper diet
- Providing adequate space for birds.

Fish production

Fish production is a great source of protein in our diet.

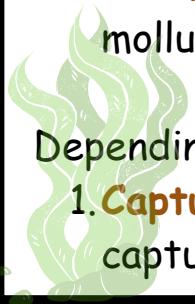


Fishes can be obtained in two ways:

1. **Finfish/True fish production:** Production and management of cartilaginous and bony fishes such as pomphret, tuna, cod, catla, prawns, rohu, etc.
2. **Shelf fish production:** Production of shellfish such as prawns, and mollusks.

Depending on the mode of obtaining fish, fishing is of two types:

1. **Capture fishing:** Naturally living fishes in various water bodies are captured.



2. Culture fishing: Fishes of the desired variety are cultivated in confined areas with utmost care to get maximum yield. This is also called aquaculture. It can be done in oceans, rivers, lakes, ponds, etc. When it is done in oceans, it is called mariculture.

Marine fishing

- It includes fish production in ponds, rivers, and reservoirs.
- Popular marine fishes include Pomphret, Tuna, Sardines, and Bombay duck.
- Some costly fish are found in the sea like mullets, seaweed, mussels, and oysters.
- Using satellites regions of high fish populations in the sea can be found.

Inland fishing

It includes fish production in freshwater (ponds, lakes, rivers) and brackish water (e.g., estuaries)



Composite fish culture

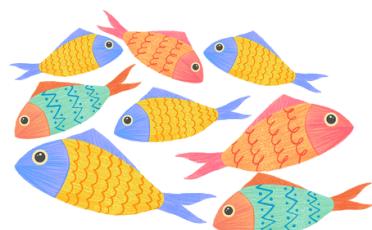
- 5-6 varieties in a single fishpond.
- They are selected so that they do not compete for food.
- They should have different food requirements.

For example:

Catla: feeds in the upper part of the water.

Rohu: feeds in the middle part of the water.

Mrigals: Feeds at bottom.



Advantages: more yield

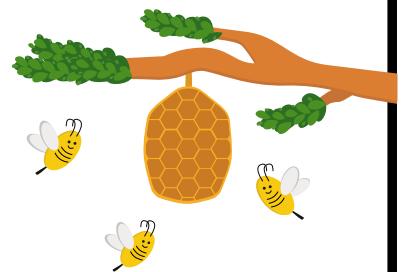
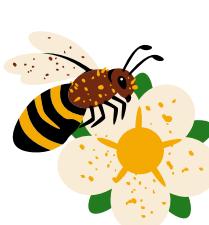
Problems: Many fish lay eggs during monsoons only, due to which number of fishes will not grow fast. So hormonal stimulation is used. Using this fish can be made to reproduce at any time.

Bee-keeping

- Practice keeping, caring, and management of honeybees on a large scale for obtaining honey and wax.
- Many farmers use bee-keeping for additional small income.
- Also there are big farms called apiaries/bee farms.



- Some common Indian varieties of bees include *apis carana indica* (Indian bee), *dorsata* (rock bee), and *floral* (little bee).
- One Italian variety *mellifera* is also used in India for commercial large-scale production because of its following advantages:
 - a. High honey collection capacity.
 - b. They sting less.
 - c. They reproduce fast.
 - d. They stay in a beehive for long.



EXPHUB 9 & 10