Improvement in food resources

Grade 9
### Topics to be Covered

1. **Crops**
   - 1.1 Uses of crops
   - 1.2 Types of crops

2. **Crop Variety Improvement**
   - 2.1 Hybridisation
   - 2.2 Genetic Modification
   - 2.3 Factors that determine the use of crop variety improvement methods

3. **Crop Production Management**
   - 3.1 Nutrient Management
   - 3.2 Cropping Pattern
   - 3.3 Irrigation Techniques

4. **Crops Protection Management**

5. **Animal husbandry**
   - 5.1 Cattle farming
   - 5.2 Poultry farming
   - 5.3 Fish farming
   - 5.4 Bee-keeping
Mind Map

**Improvement in food resources**

- **Crop and its management**
  - **Crop variety improvement**
  - **Crop production improvement**
  - **Crop protection management**

- **Animal husbandry**
  - **Cattle farming**
  - **Poultry farming**
  - **Fish farming**
  - **Bee-keeping**

- **Crop variety improvement factors**
  - Hybridisation
  - Genetic modification
  - Crop variety improvement factors

- **Crop production improvement factors**
  - Nutrient management
  - Cropping pattern
  - Irrigation techniques
Improvement in food resources

1. Crops

A plant such as a grain, vegetable, or fruit grown in large amounts on farmland and harvested for the purpose of sustenance.

1.1 Uses of crop

- **Nutritional Requirements:** Crops provide us with nutrients like carbohydrates, proteins, fats, vitamins and minerals.

- **Economic Requirements:** Harvested crops are sold on for the purpose of economic sustenance.

1.2 Types of Crops

<table>
<thead>
<tr>
<th>Rabi Crops</th>
<th>Kharif Crops</th>
</tr>
</thead>
<tbody>
<tr>
<td>Grown during winter season i.e., from <strong>November</strong> to <strong>April</strong>.</td>
<td>Grown during rainy season i.e., from <strong>June</strong> to <strong>October</strong>.</td>
</tr>
<tr>
<td>Ex: wheat, pea, linseed, mustard, etc.</td>
<td>Ex: paddy, soybean, cotton, maize, etc.</td>
</tr>
</tbody>
</table>

Wheat | Pea | Cotton | Rice
2. Crop Variety Improvement

- The process of choosing and creating better quality seeds.
- It is done by two methods.

2.1 Hybridisation

- Crossing between genetically dissimilar plants
- It is further divided into three methods:

a) Inter varietal: Cross between two varieties of the same species is done. For example, a cross between two different varieties of rice (disease-resistant (rice A) x pest-resistant (rice B)).

b) Inter specific: Cross between two different species of the same genus is done. For example, a cross between tomato (Solanum lycopersicum) and potato (Solanum tuberosum) is done to obtain pomato.

c) Inter generic: Cross between two different genera is done. For example, a cross is done between radish (Raphanus) and cabbage (Brassica) is done to obtain Brassicoraphanus.
2.2 Genetic Modification

- **Modification of genes** to get desired characteristics
- The steps of genetic modification are:

  a) A gene with desired quality is taken.

  b) This gene is added in a vector DNA which acts as a carrier.

  c) This modified DNA is introduced into the plant.

  d) Finally, this genetically modified plant is propagated to obtain its seeds and further cropping on a large scale.
2.3 Factors that determine the use of crop variety improvement methods

- **High yield**: Increase crop productivity per acre area.

- **Increase quality**: Different crops require different quality upgrades. For ex.: Shelf storage, nutrients, etc.

- **Biotic and Abiotic Resistance**: Resistance towards living factors (biotic) like pests, insects, nematodes, etc., and towards non-living factors (abiotic) like salinity, heat, etc.

- **Wider adaptability**: Crops that can be grown in different terrain and environment. Ex: Cabbage growing on plain land and terrain.

- **Change in maturity duration**: Crops with less maturity duration are more economical. Ex: One crop can be grown twice in one season.

- ** Desired agronomic characters**: Characteristics contributing to economic benefits attained from the field of agriculture. Ex: Tallness of fodder crops for easy cutting.
3. Crop Production Management

- It includes adopting techniques to ensure better yield.
- Crop production management is done under three categories: Nutrient management, cropping pattern and irrigation technique

3.1 Nutrient Management

- Plant get their nutrients from air (carbon and oxygen), water (hydrogen and oxygen), and soil (a major source of nutrients).
- Nutrients present in the soil are classified into micro and macro according to their requirement by the plants for their growth and development.

<table>
<thead>
<tr>
<th>Macro-nutrients</th>
<th>Micro-nutrients</th>
</tr>
</thead>
<tbody>
<tr>
<td>Required in <strong>larger amounts</strong></td>
<td>Required in <strong>small amounts</strong></td>
</tr>
<tr>
<td>Nitrogen, Potassium, Phosphorus, Sulphur, Magnesium, Calcium</td>
<td>Copper, Calcium, Molybdenum, Zinc, Boron, Manganese, Iron</td>
</tr>
</tbody>
</table>

**Impact of nutrient deficiency**

- Loss of reproductive ability
- Stunted growth
- Increased susceptibility to diseases
**Fertilisers**

- *Commercially produced* (in factory) plant nutrients (inorganic salts) supplied to the crops to increase productivity.
- Fertilisers are *nutrient-specific* and they are *expensive*.
- Have negative effects like reduction in soil fertility.

**Manure**

A natural growth enhancer containing a large amount of organic matter and supplies minor quantities of nutrients.

**Compost**

- Organic wastes decomposed by microorganisms to form simple nutrients.

**Vermicompost**

- Prepared by *earthworms* that speed up the composting process

**Green Manure**

- Specific plants such as *Sunn hemp*, *guar* are grown to be incorporated into the soil which decomposes to turn into nutrients that are made available for the main crops.
3.2 Cropping pattern

- Indicates the time and arrangement of crops in a particular land area.
- Can be done in 3 ways:

1. **Mixed cropping**

   Growing two or more species or cultivars of the same species simultaneously in the same field.

2. **Intercropping**

   Growing two or more crops with different nutrient requirements, simultaneously on the same field in a definite pattern.

3. **Crop Rotation**

   Growing different kinds of crops in recurrent succession on the same land.
3.3 Irrigation techniques

Tanks
Small-scale reservoirs that supply water to a nearby field

Wells
Water is taken from groundwater

Dug well:
Water is taken from water-bearing strata

Tube well:
Water is taken from deeper strata

Canals
Connected to the river and divided into distributaries to supply river water to the fields.

River-lift system
Directly using rivers as a source of water without the use of canals
4. Crop Protection Management

Protection and storage of the crops during their growing phase and also after their harvesting.

**Pre-production management**

Crops destroyed by pests, microbes, and unwanted plants (weeds) during growth of crops

**Methods to control**

- Mechanical removal of the weeds.
- Spraying of pesticides and herbicides.

**Post-production management**

- It includes the protection of crops from biotic and abiotic factors post-harvest and its storage.

**Methods to control**

- Clean and dry storage of the produce.
- Fumigation using pesticides
- Use of sun for drying the seeds pre-storage.
5. Animal husbandry

Animal husbandry is the **scientific management** of animal livestock which involves feeding, breeding, and disease control.

5.1 Cattle farming

Rearing animals like goats, cows, horses, buffaloes, etc., for milk and labour. The cattle animals are divided into two categories:

- **Milch animals**
  - Reared for the purpose of **milk production**.
  - Ex: Cows, Buffaloes, Goats, etc.

- **Draught animals**
  - Reared for the purpose of **labour**.
  - Ex: Horses, Donkeys, Camels, etc.

**Cattle Breeding**

Mating animals with desirable quality to produce highly productive and suitable animals.

**Example of cross breeding**

- **Holstein-Friesian** + **Sahiwal** = **Frieswal Cow**
  - Good quality milk
  - Disease-resistant
  - High milk yield + Disease resistant
Requirements of Cattle farming

- Providing proper and clean shelter facilities to cattle for their health as well as to produce clean milk.
- It includes:
  1. Sloping of floors and providing **well-ventilated shelters**.
  2. **Regular brushing and bathing** of animals to remove dirt and unwanted hair.
  3. **Vaccinating** the animal to protect them from diseases and infections.

### Cattle feed

#### Roughage:
- Feeds with a low density of nutrients, with crude fiber content.
- Helps in digestion.

- **Hay**
- **Fodder**

#### Concentrate:
- A mixture made up of protein supplements.
- Helps increase the content of fat in milk.

- **Gram**
- **Oil-seed cake**

### Cattle diseases

External parasites, internal parasites, and microbes like bacteria cause various diseases to cattle.
5.2 Poultry farming

- The rearing of birds is called poultry.
- It is done to obtain eggs and broilers for consumption purposes and on this basis, it is divided into:

**Layer**

Layers are **egg-laying** poultry birds which are raised for the purpose of commercial egg production.

**Broiler**

Breeding of a special variety of chicken for **edible** purposes.

**Cross breeding in poultry**

The aim of cross-breeding is to produce chicken with desired qualities like tolerance to temperature and low maintenance.
The daily food requirement for broilers is protein rich with adequate fat. The level of vitamins A and K is kept high.

For egg layers, the daily feed is kept high in protein and calcium for good eggs and strong eggshells.

**Poultry Feed**

- Groundnut cake rich in protein and fat content
- Ragi rich in protein and fiber content

**Poultry Care**

- Temperature maintenance
- Healthy poultry feed
- Housing hygiene
- Controlling diseases
5.3 Fish farming

- The rearing of aquatic organisms like fish, prawn, crab, squid, and other molluscs commercially in enclosures to be sold as food.
- Fish farming is also known as aquaculture.

Benefits of culture fish farming

- More yield
- Greater survival rate
- Complete utilisation of food resources
Culture fishes

Marine fishes
- Bombay duck
- Pomfret
- Salmon

Inland fishes
- Rohu
- Catla
- Magur

Benefits of fish meat
1. High in protein
2. Easily digestible
3. Rich in vitamin A and D
Pisciculture

Rearing of only fishes commercially in enclosures like tanks or ponds to be sold as food.

Composite fish culture

- It is also called mixed fish farming.
- In this different fishes are rearing at the same place as per their feeding zone.
5.4 Bee-keeping

- The rearing of honeybees for honey and other commercial products.
- It is also known as apiculture.
- The products obtained are honey, royal jelly, bee wax etc.

Honeybee varieties

Indigenous Breeds
- *Apis indica*
- *Apis dorsata*
- *Apis florae*

Exotic Breed
- *Apis mellifera*
Desired characteristic of bees for apiculture

- Yields a large amount of honey
- Disease resistant
- Stay for longer period in the beehive

Types of Honeybees in a beehive

**WORKER**
- 22–42 Days Life span
- The WORKER BEES makes food. They build the hive. They guard it. They look after baby bees, makes bee wax.

**QUEEN**
- 2–7 Years Life span
- Each hive has only one QUEEN BEE. She is the only bee who lays eggs.

**DRONE**
- 90 Days Life span
- DRONE BEES are male bees. They do not work. They mate with the queen bee.