

IMPROVEMENT IN FOOD RESOURCES

Improvement in food resources means increase the efficiency of production for both crop and livestock.

Improvement in Crop Fields

Types of crop:

- **Cereals:** Include crops like wheat, rice, maize, barley etc. They provide us carbohydrates.
- **Seeds:** Edible seeds include oil seeds and nuts. They provide us fats.
- **Pulses:** They include legumes such as gram, pea, black gram, green gram, lentil. They provide us proteins.
- **Vegetables, Spices and fruits:** They provide us vitamins & minerals. They include apple, mango, cherry, banana, water-melon etc.

Different crops require different conditions (temperature, moisture, etc.), different photo-periods (duration of sunlight) for their growth and completing life cycle.

Approaches which enhance the crop yield are as following:

- (i) Crop variety improvement
- (ii) Crop production improvement
- (iii) Crop protection improvement

Crop variety improvement

Ways by which variety improvement can be done are:

→ Hybridisation

☒ Genetic Modification

Hybridisation:

It is the process of crossing between two or more genetically dissimilar plants of different sexes to produce a new variety with good properties of both the crops.

Types of Hybridisation:

- ***Intervarietal Hybridisation:***

Intervarietal hybridization is the process of crossing two plants from different varieties of the same species to create a hybrid.

Example:

Triticum aestivum var. Kalyan sona × Triticum aestivum var. Sonalika

- ***Interspecific Hybridisation:***

Process of crossing two plants from different species of the same genus.

Example:

Brassica nigra (Black mustard) × Brassica rapa (Turnip) -----> Brassica juncea (Brown mustard)

- ***Intergeneric Hybridisation:***

Process of crossing two plants from different genus.

Example:

Triticum aestivum (Wheat) × Secale cereale (Rye) ----> Triticale (Wheat with high fibre content)

Genetic Modification:

Genetically modified crops are created when a desired gene is inserted into the genetic sequence of a crop.

Example : Golden rice (A rice variety which has Carotene pigment).



Factors for which improvement can be done:

Higher Yield: Increasing the productivity of the crop per unit area.

Improved quality : For different crops different qualities are considered .

For pulses, protein quality is considered

For cereals, amount of fibres or other nutrients like Vitamins and minerals are considered

For vegetables, its lifetime or preserving quality

For oil seeds, amount of good quality fat(unsaturated fat).

Desirable agronomic characters : Each type of crops prefers different characters. Fodder or vegetables plants should be tall and branched. Cereals should be dwarf as they will intake less nutrient.

Other agronomic traits are uniformity in flowering and maturity, days to anthesis, germination percent and plant density etc.

Biotic & Abiotic resistances : Abiotic stress tolerance in plants involves the factors like abiotic stresses, can include drought, heat, salinity, floods, heavy metals, and plant nutrients.

Biotic stress is the damage to plants caused by living organisms, such as: fungi, bacteria, viruses, parasitic nematodes, insects, weeds, and other indigenous or grown plants.

Plants develop a variety of tolerance mechanisms to survive such stresses, including:

Adjusting membrane systems

Maintaining cell wall architecture

Wider adaptability : Wider adaptability is a crop's ability to withstand environmental changes, such as agricultural changes or climatic conditions.

- **Withstand extremes**

Crops with wider adaptability can withstand extremes of moisture, drought, and temperature.

- **Grow in different areas**

Crop Production Improvement

It can be performed using three methods

- Nutrient management
- Irrigation
- Cropping pattern

Nutrient Management:

16 nutrients are important for plants and they get it from different sources.

Air: Carbon and Oxygen

Water: Hydrogen

Soil: 6 macronutrients are Nitrogen (N), Phosphorus (P), Potassium (K), Calcium (Ca), Sulfur (S), and Magnesium (Mg).

7 micronutrients are iron (Fe), boron (B), chlorine (Cl), manganese (Mn), zinc (Zn), copper (Cu) and molybdenum (Mo).

Macronutrients are nutrients that plants require in large quantities to grow and develop.

Micronutrients are nutrients that are required by the body in lesser amounts for its growth and development. They play a major role in the metabolic activities.

- Deficiency of Nitrogen causes stunted growth and yellowing of leaves, also known as chlorosis.
- Phosphorus deficiency causes leaves to be curled, distorted, smaller than normal.
- Calcium deficiency causes plants to be stunted and reduces flowering.
- Iron deficiency causes premature abscission of leaves.

Usage of Manures:

- **Compost:** The process in which animal excreta (like cow dung), kitchen waste, plant remains, waste food, sewage waste etc. are decomposed in pits is known as composting.
- **Vermicompost:** Compost prepared by using earthworms to hasten the process of decomposition of plants and animals refuse is called vermicompost.
- **Green manure:** Some plants like sun hemp, guar etc. are grown and after sometime mulched by ploughing in the field.

Usage of fertilizer:

- They have large amount of nutrients like nitrogen, phosphorus and potassium. Fertilizers are

Irrigation

Cropping pattern: