

Chapter 12: Improvement in Food Resources (Detailed Notes)

1. Introduction: The Need for Improvement

- **The Problem:** India's population is growing, but cultivable land is limited.
- **The Solution:** The **Green Revolution** (increased food grain production) and the **White Revolution** (increased milk production).
- **Sustainable Practices:** We must increase yields without harming the environment.

2. Crop Variety Improvement

This focuses on finding a crop variety that can give a good yield through **Hybridization** (crossing two different varieties) or **Genetic Modification**.

- **Objectives for Improvement:**
 - **Higher Yield:** To increase productivity per acre.
 - **Improved Quality:** E.g., protein quality in pulses, oil quality in oilseeds.
 - **Biotic and Abiotic Resistance:** Resistance to diseases/pests (biotic) and heat/cold/salinity (abiotic).
 - **Change in Maturity Duration:** Shorter duration allows farmers to grow multiple rounds of crops in a year.
 - **Desirable Agronomic Characteristics:** E.g., Tallness and profuse branching for fodder crops; dwarfness for cereals.

3. Crop Production Management

This involves "Nutrient Management," "Irrigation," and "Cropping Patterns."

A. Nutrient Management: Plants require 16 essential nutrients.

- **Macronutrients (6):** Required in large quantities (Nitrogen, Phosphorus, Potassium, Calcium, Magnesium, Sulphur).
- **Micronutrients (7):** Required in small quantities (Iron, Manganese, Boron, Zinc, Copper, Molybdenum, Chlorine).
- *Note:* Air provides Carbon and Oxygen; Water provides Hydrogen.

B. Manure vs. Fertilizers:

- **Manure:** Organic matter (animal excreta/plant waste). Increases soil fertility and water-holding capacity.

- **Fertilizers:** Commercially produced plant nutrients (Chemicals). High in NPK (Nitrogen, Phosphorus, Potassium). Overuse can lead to water pollution and loss of soil fertility.

C. Irrigation: Ensuring crops get water at the right stages. Methods include Wells (Dug/Tube wells), Canals, River Lift Systems, and Tanks.

D. Cropping Patterns:

- **Mixed Cropping:** Growing two or more crops simultaneously on the same piece of land (e.g., Wheat + Gram). Reduces risk.
- **Inter-cropping:** Growing two or more crops in a **definite row pattern** (e.g., Soyabean + Maize).
- **Crop Rotation:** Growing different crops on a piece of land in a pre-planned succession to maintain soil nutrients.

4. Crop Protection Management

- **Weed Control:** Weeds (like *Xanthium* or *Parthenium*) compete for food, space, and light.
- **Insect Pests:** Attack the root, stem, or leaf; suck cell sap; or bore into fruits.
- **Storage of Grains:** Biotic factors (insects, rodents, fungi) and Abiotic factors (moisture, temperature) can degrade quality. **Fumigation** is used to kill pests in storage.

5. Animal Husbandry

A. Cattle Farming:

- Used for Milk (Milch animals) and Draught labor (Draught animals).
- **Breeds:** Exotic (Jersey, Brown Swiss) for long lactation periods; Local (Red Sindhi, Sahiwal) for disease resistance.

B. Poultry Farming:

- Focuses on Layers (for eggs) and Broilers (for meat).
- Broiler chickens require vitamins A and K and a protein-rich diet.

C. Fish Production:

- **Capture Fishing:** From natural resources (oceans/rivers).
- **Culture Fishery:** Fish farming in tanks/ponds.
- **Composite Fish Culture:** Using 5-6 species in a single pond (e.g., Catlas-surface feeders, Rohus-middle zone, Mrigals-bottom feeders) so they don't compete for food.

D. Bee-keeping (Apiculture):

- Provides Honey and Wax.

- The **Italian Bee** (*Apis mellifera*) is preferred because it has high honey collection capacity, stays in a beehive for long periods, and stings less.
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