Chapter 12: Improvement in Food Resources — Detailed Premium Notes

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1. Introduction

As our population grows, the need for food also increases. But since land and resources are limited, we must find smarter ways to produce more and better-quality food.
Improvement in Food Resources means using modern methods, scientific techniques, and better management to increase both the quantity and quality of food — in a way that keeps our environment healthy and farming sustainable.

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2. Crop Production

Crop production is the process of growing crops in large quantities to meet the needs of our increasing population. Since land is limited, farmers must use better methods to grow more food from the same area.

Key Points

- ***Crop production includes all steps — soil preparation, sowing, irrigation, manuring, pest control, and harvesting.***
- ***It depends on factors like soil fertility, rainfall, irrigation facilities, and use of fertilizers.***
- ***The main aim is to increase both yield and quality of crops.***
- ***Modern techniques such as high-yield variety seeds, mechanization, and proper management help farmers produce efficiently.***
- ***Focus is also on sustainable farming — producing food without harming the environment.***
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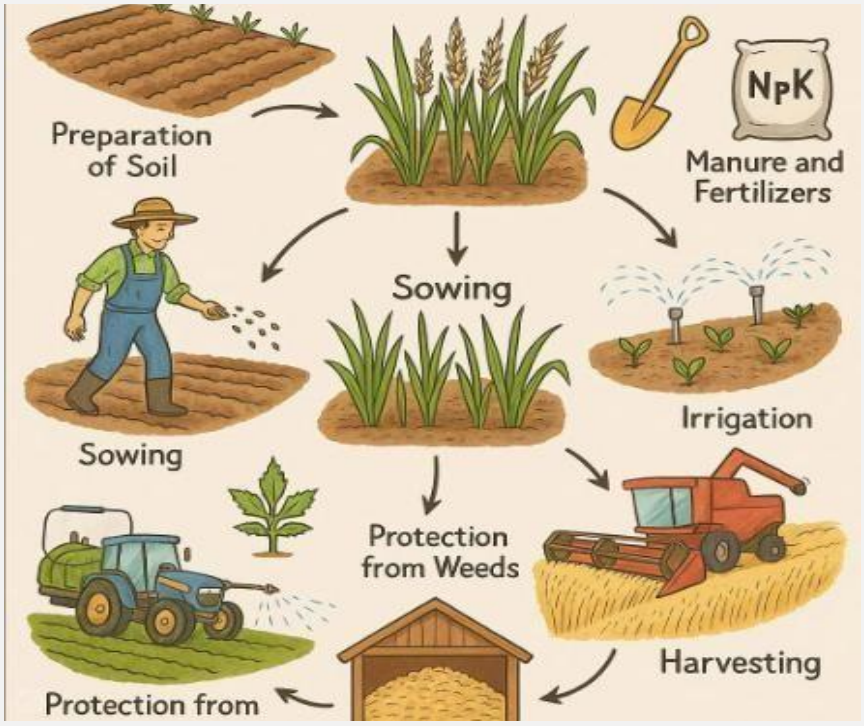
In Simple Words

Crop Production means growing crops efficiently and scientifically to get more food, better food, and safe food for everyone.



Difference Between Rabi, Kharif, and Zaid Crops

In India, crops are grown in different seasons because of variations in climate, temperature, and rainfall.
Based on the season in which they are grown, crops are classified into Rabi, Kharif, and Zaid crops.

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1. Rabi Crops (Winter Crops)

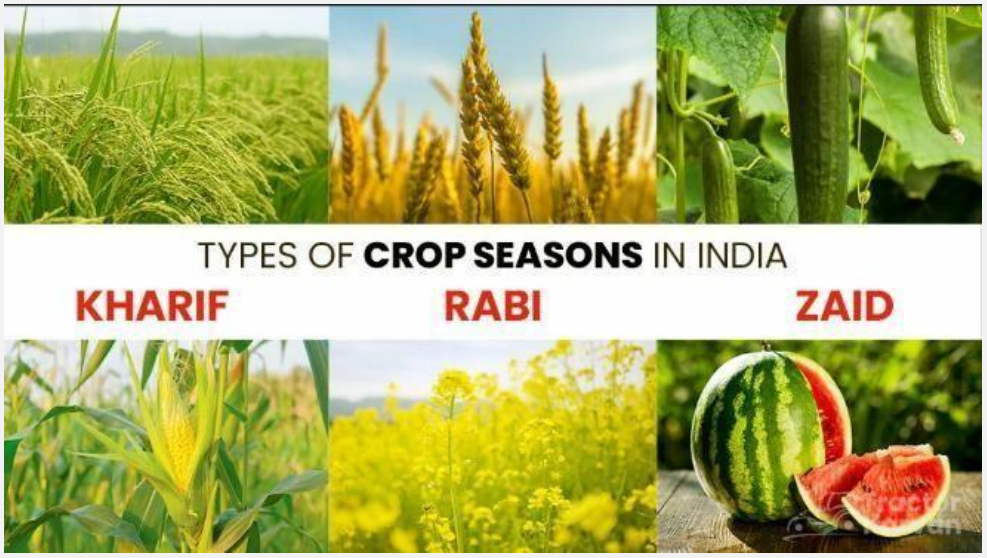
- ***Sowing Time: October to December***
- ***Harvesting Time: April to June***
- ***Climate: Require cool climate for growth and warm, dry weather at harvesting.***
- ***Irrigation: Mostly grown with irrigation, not dependent on rainfall.***
- ***Examples: Wheat, Barley, Gram, Mustard, Peas***

🌧️ *2. Kharif Crops (Monsoon Crops)*

- ***Sowing Time: June to July (with the onset of monsoon)***
- ***Harvesting Time: September to October***
- ***Climate: Need hot and wet climate with plenty of rainfall.***
- ***Water: Heavily dependent on rainwater.***
- ***Examples: Rice, Maize, Cotton, Jowar, Bajra, Soyabean***

🌞 *3. Zaid Crops (Summer Crops)*

- ***Sowing Time: March to June (between Rabi and Kharif seasons)***
- ***Climate: Require warm and dry weather but irrigated conditions.***
- ***Irrigation: Grown in areas with good irrigation facilities.***
- ***Examples: Watermelon, Muskmelon, Cucumber, Pumpkin, Moong***



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2. Crop Improvement Techniques

To meet the growing demand for food and improve its quality, farmers and scientists use crop improvement techniques. These are scientific and systematic methods that help in developing better crop varieties — ones that give higher yield, better quality, and can withstand pests, diseases, and harsh weather.

✨ *Objectives of Crop Improvement*

The main goals of improving crops are to:

- *Increase productivity — produce more food per hectare.*
- *Enhance quality — better taste, nutrition, and storage life.*
- *Develop resistance — protect crops from diseases, pests, and droughts.*
- *Ensure adaptability — crops that can grow well in different climates and soils.*
- *Reduce growth period — so that multiple crops can be grown in a year.*

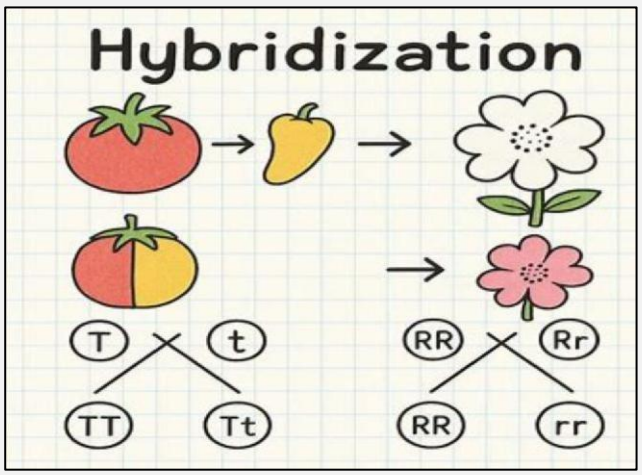
◇ *Major Techniques of Crop Improvement*

1. Hybridization (Cross-Breeding)

- *It means crossing two genetically different plants (of the same or related species) to combine their best traits.*
- *For example: Crossing a high-yielding plant with a disease resistant one.*
- *The result is a hybrid variety that has both qualities — high yield and resistance.*
- *Example: Hybrid maize, wheat, and rice varieties.*

👉 *Types of Hybridization:*

- *Inter-varietal: Between two varieties of the same species.*
- *Inter-specific: Between two species of the same genus.*
- *Inter-generic: Between two different genera.*



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2. Selection

- ***In this method, plants with desired characteristics are carefully selected and bred over several generations.***
- ***Slowly, a stable improved variety is obtained.***
- ***It is one of the oldest and simplest methods of crop improvement.***

- 🌾 ***Example: Selecting wheat plants with the largest grains or best taste.***

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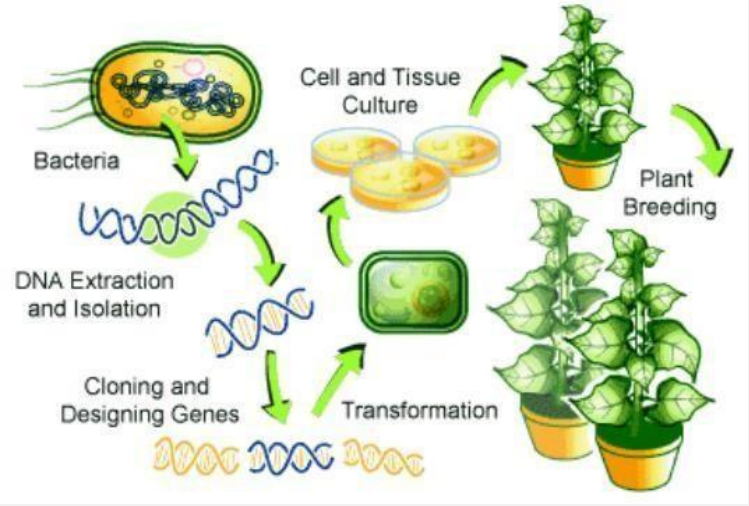
3. Genetic Modification (GM) or Biotechnology

- ***In this advanced method, specific genes are added or altered in a crop's DNA to give it new characteristics.***
- ***Example: Bt cotton — a genetically modified cotton plant that produces a natural pesticide (Bt toxin) to kill harmful insects.***
- ***Such crops are more productive, resistant, and environment friendly as they reduce pesticide use.***



🌿 *Importance of Crop Improvement*

- ***Helps in achieving food security for the growing population.***
- ***Makes farming more profitable and sustainable.***
- ***Reduces dependence on chemical fertilizers and pesticides.***
- ***Improves export quality and farmers' income.***

💡 *In Short*

Crop Improvement Techniques are scientific methods used to create better crop varieties — giving more yield, better quality, and stronger resistance, while keeping farming sustainable and efficient.

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3. Animal Husbandry

Animal husbandry means the scientific management and care of farm animals like cows, buffaloes, poultry, fish, bees, sheep, and goats for obtaining useful products such as milk, eggs, meat, wool, and honey.
It helps farmers earn extra income, provides nutritious food, and supports rural livelihoods.

Major Areas of Animal Husbandry:

🐮 *1. Cattle Farming*

Cattle are reared mainly for milk production and agricultural work (draught animals).
There are two main types of cattle:

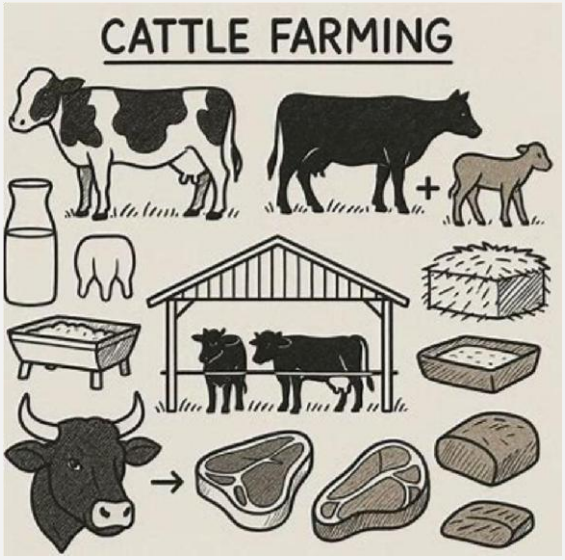
- ***Milch (Dairy) Animals: Cows and buffaloes used for milk production.***
- ***Draught Animals: Bulls and bullocks used for ploughing and transport.***

Improvement in cattle farming involves:

- ***Breed improvement: Cross-breeding Indian and foreign breeds (e.g., Sahiwal × Jersey).***
- ***Feeding: Balanced diet with fodder, grains, and oil cakes.***
- ***Health care: Vaccination and clean shelter to prevent diseases.***

Examples of Breeds:

- ***Cows: Sahiwal, Red Sindhi, Gir***
- ***Buffaloes: Murrah, Mehsana, Jaffarabadi***



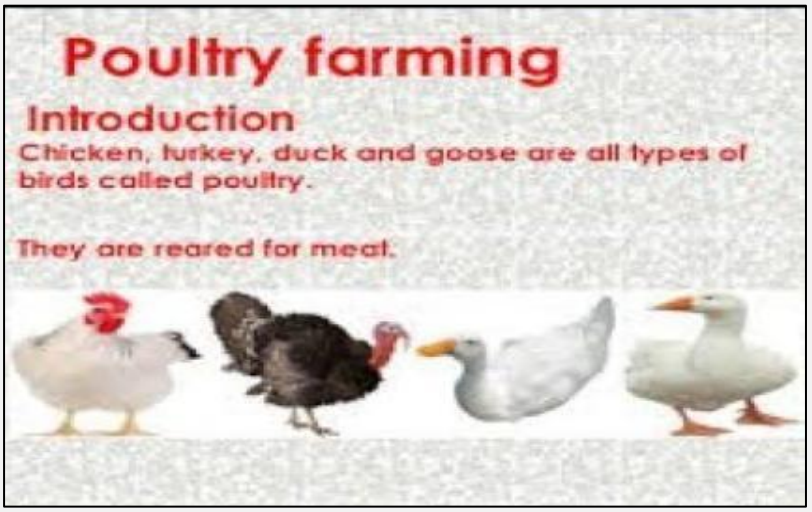
🐔 *2. Poultry Farming*

Poultry farming involves rearing birds like hens, ducks, and turkeys for eggs and meat.

It is a low-cost, high-profit occupation for farmers.

Key Points:

- ***Improved breeds: Produce more eggs and have fast growth rates.***
  Examples – White Leghorn, Rhode Island Red.
- ***Proper housing: Clean, well-ventilated poultry sheds.***
- ***Balanced feed: Grains, oil cakes, minerals, and vitamins.***
- ***Disease prevention: Regular vaccination and hygiene.***



🐟 *3. Fish Farming (Pisciculture)*

Fish farming is the rearing and breeding of fish for food and commercial purposes.
It is a major source of cheap and nutritious protein.
Types of Fisheries:

- ***Marine Fishery: Fishing in oceans and seas. Examples – Tuna, Pomfret, Mackerel.***
- ***Inland Fishery: Rearing fish in ponds, rivers, or tanks. Examples – Rohu, Catla, Mrigal.***

Composite Fish Culture:

- ***Technique of growing different species of fish together in one pond to use all food zones efficiently.***

🐠 *4. Bee-Keeping (Apiculture)*

Bee-keeping is the rearing of honeybees for honey and beeswax.
It requires less space and investment but gives high returns.
Important Points:

- ***Common species: Apis indica, Apis dorsata, Apis mellifera.***
- ***Bees help in pollination, increasing crop yield.***
- ***Honey is nutritious and used in medicine, while wax is used in cosmetics and candles.***

🐑 *5. Sheep and Goat Rearing*

Sheep and goats are reared for wool, meat, and milk.
They can survive on low-quality fodder and are suitable for dry regions.
Sheep Breeds: Lohi, Marwari, Nali (for wool)
Goat Breeds: Jamunapari, Barbari, Beetal (for milk and meat)
Proper feeding, shelter, and disease control ensure good yield and quality products.

💡 *In Short*

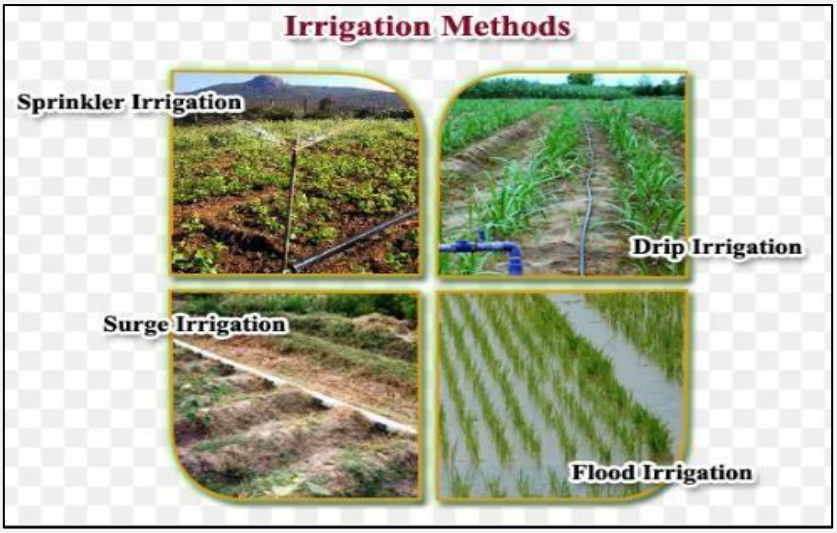
Animal Husbandry includes the rearing of animals like cattle, poultry, fish, bees, sheep, and goats for useful products — helping in food production, employment, and rural development.

4. Manure vs. Fertilizers

Manure	Fertiliser
Manure is a natural substance obtained by the decomposition of cow dung, human waste, and plant residue.	A fertiliser is an inorganic substance.
Manure can be prepared in the fields.	A fertiliser is prepared in factories.
Manure gives a lot of humus to the agriculture field.	A fertiliser not bring any humus to the field.
Manure is relatively less rich in plant nutrients.	Fertiliser are very rich in plant nutrients like nitrogen, phosphorus and potassium.
A manure is consumed slowly by the plants because it is not much dissolve in water.	soluble in water, a fertiliser is easily consumed by the plants.

5. Irrigation Methods

- ***Surface Irrigation: Water flows over the soil by gravity (canals, furrows). Simple but water-inefficient.***
- ***Sprinkler Irrigation: Water is sprayed like rainfall using pipes and sprinklers; suitable for uneven land.***
- ***Drip Irrigation: Water drips slowly near the plant roots, minimizing wastage and evaporation. Best for water conservation.***



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6. Storage and Preservation of Food

- ***Proper storage prevents loss from pests, microorganisms, and spoilage.***

- ***Methods include:***

○ ***Drying: Reducing moisture content to prevent microbial growth.***

○ ***Cooling/Refrigeration: Slows down spoilage and microbial activity.***

○ ***Canning: Sealing food in airtight containers and heating to kill microbes.***

○ ***Use of Pesticides: Chemicals to prevent insect damage during storage.***

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7. Sustainable Agricultural Practices

- ***Crop Rotation: Growing different crops sequentially on the same land to maintain soil fertility and reduce pests.***

- ***Mixed Cropping: Growing two or more crops simultaneously to improve yield and reduce risk.***

- ***Organic Farming: Using natural fertilizers and biopesticides to reduce chemical use.***

- ***Integrated Pest Management: Combining biological, mechanical, and chemical methods to control pests sustainably.***

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8. Sample Questions

1. Explain the advantages of drip irrigation over surface irrigation.

○ ***Saves water by delivering it directly to roots.***

○ ***Minimizes evaporation and runoff.***

○ ***Suitable for uneven terrain and hilly areas.***

2. What is the role of biotechnology in agriculture?

○ ***Produces disease-free, high-yielding plants via tissue culture.***

○ ***Develops genetically modified crops resistant to pests and harsh conditions.***

3. Why is manure preferred over chemical fertilizers in organic farming?

○ ***Manure improves soil texture and microbial activity.***

○ ***Chemical fertilizers can degrade soil health over time.***