



Chapter – 12

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IMPROVEMENT IN FOOD RESOURCES

India is a very populous country. As food for this growing population, can be fulfilled by farming on more land.

Efforts to meet the food demand by increasing food production have led to some successes so far. We have had the green revolution, which contributed to increased food-grain production. We have also had the white revolution, which has led to better and more efficient use as well as availability of milk.

However, these revolutions mean that our natural resources are getting used more intensively. As a result, there are more chances of causing damage to our natural resources to the point of destroying their balance completely. Therefore, it is important that we should increase food production without degrading our environment and disturbing the balances maintaining it.

Scientific management practices should be undertaken to obtain high yields from farms. For sustained livelihood, one should undertake mixed farming, intercropping, and integrated farming practices, for example, combine agriculture with livestock/ poultry/ fisheries/ bee-keeping.

Improvement in Crop Yields

Different crops require different climatic conditions, temperature and photoperiods for their growth and completion of their life cycle. Photoperiods are related to the duration of sunlight. Growth of plants and flowering are dependent on sunlight. Based on the seasons of cultivation, crops are classified in two categories:

1. Kharif Crop and 2. Rabi Crop

1. Kharif Crop

There are some crops, which are grown in rainy season, called the kharif season from the month of June to October. Paddy, soyabean, pigeon pea, maize, cotton, green gram and black gram are kharif crops,

2. Rabi crop

There are some of the crops are grown in the winter season, called the rabi season from November to April. Wheat, gram, peas, mustard, linseed are rabi crops.

Thus, the major groups of activities for improving crop yields can be classified as:

- **Crop variety improvement**
- **Crop production improvement**
- **Crop protection management.**

CROP VARIETY IMPROVEMENT

This approach depends on finding a crop variety that can give a good yield. Varieties of crops can be selected by breeding for various useful characteristics such as disease resistance, response to fertilisers, product quality and high yields.

Method of Crop Variety Improvement

1. Hybridisation: - Hybridisation refers to crossing between genetically dissimilar plants. This crossing may be inter varietal (between different varieties), interspecific (between two different species of the same genus) or inter generic (between different genera).

2. Introduction: - Another way of improving the crop is by introducing a gene that would provide the desired characteristic. It involves taking a new variety of a plant from an area where it grows naturally to a region where it does not occur before.

Factor Affecting Variety Improvement

Some of the factors for which variety improvement is done are:

1. Higher yield: To increase the productivity of the crop per acre.

2. Improved quality: Quality considerations of crop products vary from crop to crop.

3. Biotic and abiotic resistance: Crops production can go down due to biotic (diseases, insects and nematodes) and abiotic (drought, salinity, water logging, heat, cold and frost) stresses under different situations.

4. Change in maturity duration: The shorter the duration of the crop from sowing to harvesting, the more economical is the variety.

5. Wider adaptability: One variety can then be grown under different climatic conditions in different areas.

II. CROP PRODUCTION IMPROVEMENT

It has three components:

It involves controlling the various aspects of crop production so as to obtain the maximum and quality yield.

1. Nutrient management

2. Irrigation

3. Cropping patterns

1. Nutrient Management

The main sources of nutrients for plants are air, soil and water. In total, there are sixteen nutrients required by plants. Out of these, two nutrients (carbon and oxygen) are obtained from air. Hydrogen is obtained from water. These three elements- carbon, oxygen and hydrogen are called non-essential elements as they are not obtained from soil. The remaining thirteen nutrients are obtained from soil with the help of roots. They are called mineral nutrients or

essential nutrients.

(i) Micronutrients: Nutrients required in small quantities are called micronutrients.

(ii) Macronutrients: Nutrients required in larger quantities are called macronutrients.

Manure

Manure is a natural fertilizer. It is prepared by the decomposition of plant and animal waste. Manure helps in enriching soil with nutrients and organic matter and increasing soil fertility.

Composition of Manure

Manure is a source of many plant nutrients. It is composed of organic matter and minerals. Ammonia, nitrate, organic substances, etc. are predominant organic matters found in manures. Manures are mostly composed of micronutrients such as zinc, manganese, copper, magnesium, sodium, etc.

Types of manures

Based on the kind of biological material used, manures can be classified as

Farmyard manure: Farmyard manure is formed from decomposed cattle dung (excreta) and urine, left over fodder

(cattle feed) and litter (bedding provided to cattle in the firm).

Compost: Compost is manure made from vegetable and animal refuse collected from domestic waste, straw, and weeds etc. dumped in a deep pit to decompose.

Green Manure: Prior to the sowing of the crop seeds, some plants like sun hemp or guar are grown and then mulched by ploughing them into the soil. These green plants thus turn into green manure which helps in enriching the soil in nitrogen and phosphorus.

Advantages of Manure

It enriches the soil with organic material called humus to the soil, and increases the water holding capacity of soil.

It also aerates the soil by making it porous, and helps in growth of micro-organisms.

The organic matter of manures provides food for the soil organisms which help in making nutrients available to plants.

It improves the soil texture and increased crop production.

Fertilizers

Fertilizers are plant nutrients, which are commercially available. They can be organic or inorganic in nature. They

ensure healthy growth and development in plants by providing them with nitrogen, phosphorus, potassium, etc.

Advantages of Fertilizers

They are mostly inorganic compounds, which can readily dissolve in water. They are easily available for plants. They are a good source of nitrogen, phosphorus, and potassium. However, they are good only for a short term use. They are nutrient specific and require in small amount.

2. Irrigation

Water is essential for the growth of plants. Plants obtain water from soil and soil obtains water from rain. The process of supplying water to crops in the fields is called irrigation. The various sources of irrigation are wells, canals, rivers, dams, ponds and lakes

Importance of Irrigation

Irrigation makes the soil soft due to which ploughing becomes easier.

Irrigation water helps in absorption of nutrient elements by plants from soil.

Irrigation is essential for the growth and elongation of the roots of the crop plants as roots of crop plants fail to develop and elongate in dry soil.

(3) CROPPING PATTERNS

Different ways of growing crops can be used to give maximum benefit.

(i) Mixed cropping is growing two or more crops simultaneously on the same piece of land, for example, wheat + gram, or wheat + mustard, or groundnut + sunflower.

(ii) Inter cropping: It is the practice of growing two or more crops simultaneously in a same field in a definite row patterns. This technique enhances the productivity per unit area. The crops selected have different nutrient requirements, different sowing and harvesting dates. For example (i) Soyabean + Maize 2. Bajra + Lobia

III. CROP PROTECTION MANAGEMENT

Crops are affected by pests and a large number of weeds in fields. Uncontrolled growth of weeds and pests reduce productivity. Crop protection management involves protection of crops from their pests, pathogens and weeds

Preventive measures of insect pests and weeds

(1) Using pesticides is the most common method used to eradicate weeds, pests, and infectious diseases. These chemicals are generally sprayed on crops.

Herbicides are used to eradicate weeds

Fungicides are used to destroy fungus Insecticides are used against insects.

(ii) The process of removing weeds from the cultivated field is called weeding. Weeds can be eradicated by the following methods

(iii) Mechanical removal: It involves pulling of weeds with hand.

Storage of Grains

After harvesting the grains are stored in store houses. Different biotic and abiotic factors that affect the storage.

Biotic factors

Insects, rodents, fungi, mites and bacteria.

Abiotic factors

Moisture, humidity and temperature.

Preventive Measures to be taken before Storing the Food Grains

Maintenance of hygiene. This includes:

(i) Cleaning of floors before storing the grains

ii The containers used for storing grains should be clean and dry with air tight lids

iii Frequent chemical fumigation to kill all pests fungi etc.

(iv) Proper aeration and ventilation to control moisture and temperature levels.

Drying: The grains can be dried in the sun or by blowing hot air on them.

Maintaining storage containers: Godowns or gunny bags or tanks or earthen pots used for storage should be free of cracks and holes and should be clean.

Chemical treatment Spraying or fumigation (insecticide solution converted into fumes) of godowns and containers with insecticides and fungicides should be done before storage.

Use of improved storage structures: Structures which are airtight, rat proof, moisture proof and can maintain a steady temperature are now used for storage.

Animal Husbandry

Animal husbandry is the scientific management of animal livestock. It includes various aspects such as feeding, breeding and disease control. Animal-based farming includes cattle, goat, sheep, poultry and fish farming.

CATTLE FARMING

Cattle husbandry is done for two purposes— milk and draught labour for agricultural work such as tilling, irrigation and carting.

Milk-producing females are called milch animals (dairy animals).

While the ones used for farm labour are called draught animals.

Exotic or foreign breeds (for example, Jersey, Brown Swiss) are selected for long lactation periods, while local breeds (for example, Red Sindhi, Sahiwal) show excellent resistance to diseases. The two can be cross-bred to get animals with both the desired qualities.

Proper cleaning and shelter facilities for cows and buffaloes are required for the health of the animals and for production of clean milk as well.

Animals require regular brushing to remove dirt and loose hair.

They should be sheltered under well-ventilated roofed sheds that protect them from rain, heat and cold.

The floor of the cattle shed needs to be sloping so as to stay dry and to facilitate cleaning.

Cattle need balanced rations containing all nutrients in proportionate amounts.

Cattle suffer from a number of diseases. The diseases, reduce milk production. The parasites of cattle may be both external parasites and internal parasites. The external parasites live on the skin and mainly cause skin diseases. The internal parasites like worms, affect stomach and intestine while flukes damage the liver.

Vaccinations are given to farm animals against many major viral and bacterial diseases.

POULTRY FARMING

Poultry farming is undertaken to raise domestic fowl for egg production and chicken meat. Therefore, improved poultry breeds are developed and farmed to produce layers for eggs and broilers for meat.

Need of Poultry Farming

Egg Production: For increasing egg production for the development of new improved variety with respect to quantity and quality of eggs, the following points are considered are egg number, shell quality, body weight and internal quality of egg.

Meat production: Fowls raised for obtaining meat are called broilers. They are generally males but can also be female. Broilers are fed with vitamin rich supplementary feed for good growth rate and better feed efficiency. Care is taken to maintain feathering and carcass quality.

FISH PRODUCTION

Fish is a cheap source of animal protein for our food. There are two ways of obtaining fish. One is from natural resources, which is called capture fishing. The other way is by fish farming, which is called culture fishery.

The water source of the fish can be either seawater or fresh water, such as in rivers and ponds. Fishing can thus be done both by capture and culture of fish in marine and freshwater ecosystems.

(i) MARINE FISHERIES

Marine Fisheries: They are fish catching areas found in sea. It is of three types coastal, offshore and deep sea. The edible marine capture fishes are tuna, sardines, Bombay duck, pomphrets etc

Mariculture: The culture of marine fishes for commercial use is called mariculture. For examples, mullets, bhетки, pearl spots, eel, and milk fish.

(ii) Inland fisheries: The fisheries that deal with fresh and brackish water are known as inland fisheries Inland fisheries are of two types; culture fishery and capture fishery.

Culture fishery is a type of fishery practiced in small water bodies where fish is first reared and then harvested.

Capture fishery is the method in which fishes are captured by manmade ponds.

BEE KEEPING

The practice of bee keeping is called apiculture. Apiculture is rearing, care and management of honey bees for obtaining products like honey, propolis, bee venom etc.

Common Species of Honey bee:

There are two varieties of honey bees that are used for commercial production of honey in India.

Indigenous varieties, which include *Apis cerana indica* (Indian bee), *Apis dorsalis* (Rock bee)

Exotic varieties, which include: *Apis mellifera* (Italian or European bee), *Apis mellifera* (South African bee)

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