

## *Chapter-15 : Improvement in food resources*

**Need for increasing food production :** Our population is more than one billion and it is still growing. We will need more than a billion tonnes of grain every year to feed this growing population.



- Since increasing the area of land for cultivation is limited, it is necessary to increase the production efficiency of crops and livestock.
- The production efficiency of crops and livestock can be increased by adopting scientific management practices to improve crop yield, undertaking mixed farming, intercropping and integrated farming practices like combining agriculture with livestock, poultry, fisheries, bee-keeping etc.

**Different types of crops :** Cereals like rice, wheat, maize, millets, sorghum etc. provide us carbohydrates. Pulses like peas, beans, grams, lentils etc. provide us proteins. Oil seeds like groundnut, sesame, castor, mustard, linseed, sunflower etc. provide us fats. Vegetables, spices and fruits provide us vitamins and minerals along with small amounts of carbohydrates, fats and proteins.

- Fodder crops like berseem, oats or Sudan grass are grown as food for livestock.
- Different crops require different climatic conditions, temperature and duration of sunlight (photoperiods).
- Kharif crops are crops grown during the rainy season from June to October like paddy, soya bean, maize, pigeon pea, green gram, black gram, cotton etc.
- Rabi crops are crops grown during winter season from November to April like wheat, gram, peas, mustard, linseed etc.

**Improvement in crop yield :** Crop yield can be improved by three main activities. They are Crop variety improvement, Crop production improvement and Crop protection management.

**Crop variety improvement :** Crop variety improvement is done by selecting good varieties of crops. This is done by hybridization. Hybridization is the crossing between genetically dissimilar plants to obtain crops having useful characteristics like disease resistance, good quality and high yields.



- Hybridization may be intervarietal (between different varieties), interspecific (between different species of the same genus) or intergeneric (between different genera).
- Another way of improving crop variety is by introducing a gene to obtain the desired characteristic. This produces genetically modified crops.

**Crop variety improvement is done for the following :**

**Higher yield** : To increase productivity of crop per acre.

**Biotic and abiotic resistance** : To increase resistance of crops to biotic factors like insects, diseases etc. and abiotic factors like draught, salinity, heat, cold etc.



**Change in maturity duration** : To reduce the duration between sowing and harvesting so that farmers can grow multiple crops during the year.

**Wider adaptability** : To grow crops in different climatic conditions.

**Desirable agronomic characters** : Characters like tallness and more branching are useful for fodder crops and dwarfness (shortness) is desirable for cereal crops.

**Crop production management** : Crop production management includes Nutrient management, Irrigation and Cropping management.

**Nutrient management** : Plants get nutrients from air, water and soil. There are sixteen nutrients required by plants for their proper growth. Air supplies oxygen and carbon dioxide, water supplies hydrogen and the remaining thirteen nutrients are obtained from the soil.

- Among the sixteen nutrients required by plants, six are required in large quantities and are called macro-nutrients. The macro-nutrients are nitrogen, phosphorus, potassium, calcium, magnesium and sulphur.
- The other seven are required in small quantities and are called micro-nutrients. Soil can be enriched by supplying nutrients in the form of manures and fertilizers. The micro-nutrients are iron, manganese, boron, zinc, copper, molybdenum and chlorine.

**Manure** : Manure is prepared by the decomposition of plant and animal waste. It contains organic matter and nutrients. It helps to increase soil fertility. It also helps to reduce use of fertilizers and recycle farm waste and protects the environment. There are two main types of manures. They are compost and green manure.

**Compost** : Compost is prepared by the decomposition of plant and animal waste in compost pits. Compost prepared by using earthworms is called vermi-compost. Compost is rich in organic matter and nutrients.

**Green manure** : Before sowing seeds in fields, some green plants like sun hemp, gaur etc. are mixed in the soil by ploughing. These plants turn into green manure which makes the soil rich in nitrogen and phosphorus.



**Fertilizers** : Fertilizers are chemical substances made commercially. They supply nitrogen, phosphorus and potassium and help to increase crop yield. Fertilizers should be used only in required amounts. Excessive use of fertilizers can reduce soil fertility and also cause water pollution.

**Irrigation** : The supply of water to the crops is called irrigation. Water is necessary for the proper growth of plants and helps to increase crop yield. Different kinds of irrigation systems are used to supply water to agricultural land. They are wells, canals, rivers, tanks, check dams etc.

**Wells** : There are two types of wells called dug wells and tube wells. In dug wells water is collected from water bearing strata. In tube wells water is collected from deeper strata.

**Canals** : In this system, canals receive water from reservoirs or rivers and distributes it to fields.

**River lift systems** : In this system water is lifted from rivers to irrigate fields close to rivers.

**Tanks** : These are small storage reservoirs which supply water to fields.

**Check dams** : These are used to stop rain water from flowing away and helps to increase groundwater levels and reduce soil erosion.

**Cropping patterns** : Different ways of growing crops are used for maximum benefit. These include mixed cropping, inter-cropping and crop rotation.

**Mixed cropping** : Mixed cropping is growing two or more crops simultaneously in the same field. E.g.- wheat + gram, wheat + mustard, groundnut + sunflower etc. This reduces the risk even if one crop fails.

**Inter-cropping** : Inter-cropping is growing two or more crops simultaneously in the same field in alternate rows. E.g.- maize + soya bean, millet + cow pea etc. Crops with different nutrient requirements are selected. This helps in better use of nutrients and prevents spreading of diseases to all plants of the same crop.



**Crop rotation** : Crop rotation is growing different crops in the same field in succession. Growing leguminous crops after growing cereal crops helps to increase soil fertility. If crop rotation is done properly, two or three crops can be grown in a year profitably.



**Crop protection management** : Crops in the field are damaged by weeds, insect pests and diseases.

- Weeds are unwanted plants which grow in the field. E.g.- Xanthium, Parthenium, Cyperinus rotundus etc. They compete

with the crop for food, space and sunlight and use nutrients and reduce crop yield.

- Insect pests cause damage to the root, stem and leaves, suck cell sap and bore into stems and fruits. They can reduce crop yield.
- Diseases in plants are caused by pathogens like virus, bacteria and fungi and reduces crop yield.
- Weeds, insect pests and diseases can be controlled by using chemicals like weedicides, pesticides, fungicides etc. They are sprayed on crop plants or used for treating seeds and soil. Since these chemicals are poisonous, excessive use of these chemicals can cause environmental pollution.

**Storage of grains :** The factors responsible for the damage and loss of grains are biotic factors like bacteria, fungi, insects, rodents etc. and abiotic factors like moisture and temperature in the place of storage. Before storage, the grains are cleaned and dried in sunlight to remove moisture and the storage places are fumigated to kill pests.



**Animal husbandry :** Animal husbandry is the scientific management of animal livestock including their feeding, breeding and disease control. Animal farming includes cattle, sheep, goat, poultry and fish farming.

**Cattle farming :** Cattle farming is done for two main purposes. They are for milk production and farm labour. Milk producing females are called milch animals and those used for farm labour are called draught animals.



- Milk production depends on the duration of the lactation period (the period of milk production after the birth of the calf). Milk production can be increased by increasing the lactation period. Foreign breeds like Jersey and Brown Swiss have long lactation periods and local breeds like Red Sindhi and Sahiwal are resistant to diseases. They can be cross-bred to get animals with both the qualities.
- Cattle shelter should be clean and well ventilated with sloping floors for easy cleaning.
- Cattle feed should include roughage containing mainly fibre and concentrates containing protein and other nutrients.
- Cattle diseases are caused by parasites, bacteria and virus. External parasites cause skin diseases. Internal parasites like

worms affect stomach and intestine and flukes damage the liver. Vaccinations are given to protect from viral and bacterial diseases.

**Poultry farming** : Poultry farming is done for egg production and chicken meat.



- Improved poultry breeds are developed to produce layers for eggs and broilers for meat.
- Cross-breeding between Indian varieties like Aseel and foreign varieties like Leghorn is done to develop new varieties.
- For good production of poultry birds they are given proper nutrition and kept in hygienic conditions and proper temperature conditions.
- Broiler chickens are feed with vitamin, protein and fat rich food for better growth.
- Poultry fowls are affected by diseases caused by virus, bacteria, fungi and parasites. They are protected from

diseases by proper sanitation, spraying disinfectants and vaccination.

**Fish production (Pisciculture) :** Fish is a source of animal protein in our food. There are two ways of obtaining fish. They are from natural sources called capture fishing and from fish farming called culture fishery. The water source of fishes can be sea water (marine) or fresh water like rivers, ponds, lakes etc.

**Marine fisheries :** The popular marine fish varieties are pomphret, mackerel, tuna, sardines etc. They are caught by fishing nets from boats. Some marine fishes are farmed in sea water. These include prawns, mullets, pearl spots, mussels, oysters etc. We get pearls from oysters.



**Inland fisheries :** Culture fishery is done in freshwater and brackish water where sea water and fresh water mix together. Sometimes fish culture is done in combination with paddy crop in the

field. This is called composite fish culture. The common fishes in inland fish farms are rohu, catla, mrigal, grass carp, silver carp, common carp etc.



**Bee-keeping (Apiculture) :** Bee-keeping is done to obtain honey and wax. Honey is used as a source of energy and also has medicinal uses. Wax is used in medicinal preparations and for making polishes.

- The local varieties of bees used for honey production are the Indian bee, Rock bee and Little bee. An Italian variety of bee is also being used for large scale production of honey.
- The bees collect nectar from flowers and convert it into honey in the bee hives. Bees are artificially grown in apiaries and the honey is extracted by machine called honey extractors.



Website :) “harsitbiowallah.github.io” :) youtube:) “harist bio wallah”

Full lecture video on youtube