

9th Improvement in Food Resources

It is necessary to increase our production efficiency for both crops and livestock to fulfil food for growing population our country.

We have had much revolution to meet increasing demand of food .The green revolution contributed to increased food-grain production. White revolution for better availability of milk. Blue revolution for better production of fishes and Yellow revolution for oilseeds production.

There is a need for sustainable practices in agriculture and animal husbandry so that we should increase food production without degrading our environment and disturbing the balances maintaining it.

Steps of sustainable practices in agriculture

Improvement in Crop Yields:

Cereals provide us carbohydrate for energy requirement. Pulses provide us with protein. And oil seeds provide us with necessary fats. Vegetables, spices and fruits provide a range of vitamins and minerals in addition to small amounts of proteins, carbohydrates and fats.

Crops, which are grown in rainy season, called the *kharif* (June to October) , and the crops that are grown in winter season (November to April) called the *rabi*. Paddy, soyabean, pea, maize, cotton, green gram and black gram are *kharif* crops, whereas wheat, gram, peas, mustard, linseed are *rabi* crops.

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: A crop variety that can give a good yield can be selected on the basis of resistance from diseases, response to fertilisers, product quality and high yields.

Hybridization: One way of getting desirable crops varieties is hybridization. Hybridisation refers to crossing between genetically dissimilar plants. This crossing may be intervarietal (between different varieties), interspecific (between two different species of the same genus) or intergeneric (between different genera).

Gene transfer: Another of getting desirable crops varieties is by introducing a gene that would provide the desired characteristic. This results in genetically modified crops.

The factors for which variety improvement is done are:

- (a) Higher yield: (b) Improved quality (c) Biotic and abiotic resistance (d) Change in maturity duration (e) Wider adaptability: (f) Desirable agronomic characteristics:

Factors that reduce crop production: Crops production can go down due to biotic factors (diseases, insects and nematodes) and abiotic factors (drought, salinity, water logging, heat, cold and frost) in different situations.

Self work

1. How do biotic and abiotic factors affect crop production?

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2. What are the desirable agronomic characteristics for crop improvements?

⇒ Tallness and excess branching are desirable characters for fodder crops. Dwarfness is desired in cereals.

CROP PRODUCTION MANAGEMENT

(a) NUTRIENT MANAGEMENT: Amongst thirteen nutrients required by plant, six are required in large quantities and are therefore called macronutrients. The other seven nutrients are used by plants in small quantities and are therefore called micro-nutrients.

Nutrients supplied to plants naturally by air, water and soil	
Source	Nutrients
Air	carbon, oxygen
Water	hydrogen, oxygen
Soil	(i) Macronutrients: nitrogen, phosphorus, potassium, calcium, magnesium, sulphur
	(ii) Micronutrients: iron, manganese, boron, zinc, copper, molybdenum, chlorine

Self work

1. What are macro-nutrients and why are they called macronutrients?

Ans: Macro-nutrients are those nutrients which are required in large quantities for growth and development of plants. Since they are required in large quantities, they are known as macro-nutrient. The six macro-nutrients required by plants are nitrogen, phosphorus, potassium, calcium, magnesium, and sulphur.

2. How do plants get nutrients?

Ans: Plants get nutrients naturally by air, water and soil. Soil is the major source of nutrients.

Steps of crop production:

(a) Manure: Manure are organic matter that supplies small quantities of nutrients to the soil.

Manure is prepared by the decomposition (anaerobic respiration) of animal excreta and plant waste.

Manure helps in enriching soil with nutrients and organic matter that increasing soil fertility.

Manure also helps in improving the soil structure. This increasing the water holding capacity in sandy soils. In clayey soils, the large quantities of organic matter help in drainage and in avoiding water logging.

Manure can be classified as:

(i) Compost and vermi-compost: The manure obtained by anaerobic degradation of cattle dung and domestic and factory waste etc in a pit is known as Composting. The compost is rich in organic matter and nutrients.

Compost that is prepared by using earthworms that quickly help in decomposition of plant and animal waste. This is called vermicompost.

(ii) Green manure: some plants like sun hemp or guar are grown and then a layer of these materials applied to the surface of an area of soil by ploughing them into the soil. These green plants thus turn into green manure which helps in enriching the soil in nitrogen and phosphorus.

(b) Fertilizers: We should use fertilizer carefully in terms of proper dose only for short period.

Excess fertilizers washed away due to excessive irrigation and are not fully absorbed by the plants. This excess fertilizer then leads to water pollution.

The continuous use of fertilizers in an area can destroy soil fertility because the organic matter in the soil is not replenished and micro-organisms in the soil are harmed by the fertilizers used.

Farming without the use of chemicals. is called organic farming.

Living organisms like nitrogen fixing bacteria, blue green algae and minerals solubilising bacteria are called biofertilizers. Eg. Blue green bacteria,(nostoc, anabaena etc.)

Biofertilisers are used in organic farming to increase soil fertility. They are prepared by using organisms like blue-green algae. Neem leaves and turmeric are used as biopesticides.

Self work: Q. Compare the use of manure and fertilizers in maintaining soil fertility.

Manure used for long period. Manures increase soil fertility by enriching the soil with organic matter and nutrients as it is prepared by the decomposition of animal excreta and plant wastes. On the other hand, fertilizers are mostly inorganic compounds whose excessive use is harmful to the symbiotic microorganisms living in soil. Their excessive use also reduces soil fertility. Hence, fertilizers are considered good for only short term use.

(b) Method of irrigation: The practice of supplying of water to crops is called irrigation

Different kinds of irrigation systems:

a) Sprinkler system: In this method of irrigation, water is supplied using pipes to one or more central locations within the field. When water is allowed to flow under high pressure with the help of a pump, it gets sprinkled on the crops. This system is more useful on uneven land and sandy soil , having fewer water supplies.

(b) Drip system: In this system of irrigation, water is delivered at or near the roots of plants, drop by drop. This is the most efficient method of irrigation as there is no wastage of water at all. This method is important in areas where water availability is poor.

Rainwater harvesting and watershed management: Rainwater harvesting is a technique used for collecting, storing and using rainwater for irrigation and other uses. The rainwater is collected from various hard surfaces such as roof tops and/or other manmade aboveground hard surfaces.

Watershed management: The management of water resources in an certain area. It is done to increase the utility of rainwater by building small check- dams . The check-dams stop the rainwater from flowing away and also reduce soil erosion.

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

Mixed cropping: The practice of growing two or more crops simultaneously on the same piece of land is called Mixed cropping, for example, wheat + gram, or wheat +mustard, or groundnut + sunflower. This reduces risk against failure of one of the crops.

Inter-cropping is growing two or more crops simultaneously on the same field in a definite pattern. A few rows of one crop alternate with a few rows of a second crop, for example, soyabean + maize.

The crops for Inter-cropping are selected such that their nutrient requirements are different. This help in maximum utilization of the nutrients and also prevents pests and diseases from spreading to all the plants belonging to one crop in a field.

Crop rotation: Growing different crops on the same piece of land in a pre planned succession is called crop rotation. E.g. rice- wheat. The availability of moisture and irrigation facilities decide the choice of the crop to be cultivated after one harvest in Crop rotation.

CROP PROTECTION MANAGEMENT : Crops need protection from weeds, insect pests and diseases.

Weeds are unwanted plants grow along crops and compete for nutrients, space and sunlight. Is called weeds for example, Xanthium, Parthenium (gajar ghas), Cyperinus rotundus (motha).

Insect and pests attack the plants in three ways:

(i) They cut the root, stem and leaf, (ii) they suck the cell sap from various parts of the plant, and (iii) they make small hole stem and fruits.

Pathogens are organism such as bacteria, fungi and viruses that carry disease causes micro organism.

One of the most commonly used methods is the use of pesticides, which include herbicides, insecticides and fungicides. excessive use of these chemicals creates problems, since they can be poisonous to many plant and animal species and cause environmental pollution.

Why should preventive measures and biological control methods be preferred for protecting crops.

Solution: Preventive measures and biological control are safe methods for protecting crops. They do not cause environmental pollution. Chemical measures such as spraying chemicals on crops or treating seeds with chemicals cause environmental pollution. Moreover, biological control method protect crops from the beginning, i.e before weeds, pests and diseases tend to affect the plants.

STORAGE OF GRAINS

Storage losses in agricultural produce can be very high. Factors responsible for such losses are biotic— insects, rodents, fungi, mites and bacteria, and abiotic— inappropriate moisture and temperatures in the place of storage.

Food resources: Animals

Animal husbandry: The science of breeding and caring for farm animals is called animal husbandry. It includes various aspects such as feeding, breeding and disease control.

Cattle farming:

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

Indian cattle belong to two different species – (*Bos indicus*) cows, and (*Bos bubalis*) buffaloes.

Milk-producing females are called milch animals (dairy animals), while the ones used for farm labour are called draught animals.

Milk production depends on:

(a) The duration of the lactation period (the period of milk production after the birth of a calf.).

Exotic or foreign breeds (for example, Jersey, Brown Swiss) are selected for long lactation periods

(b) excellent resistance to diseases: local breeds for example, Red Sindhi, Sahiwal) show excellent resistance to diseases

Which method is commonly used for improving cattle breeds and why?

Ans: Cross breeding method is commonly used for improving cattle breeds as animal get desired characteristics of both breed crossed.

Care taken in Cattle farm:

(i) Shelter of cattle must be spacious, clean, dry and well ventilated. There should be proper arrangement for the disposal of animal waste.

(ii) Animal should feed only food having low nutrient content called roughage .eg fodder, hay, straw and Food low in fibres but contain relatively high proteins and other nutrients called concentrate e.g. oil seed cake,

(ii) Animals require regular brushing to remove dirt loose hair called Grooming.

4. Protection from diseases - Cattle suffer from various diseases. External parasites live on skin and cause skin disease. Internal parasites like worm affect stomach and fluke damages liver.

Poultry farming

Poultry farming is practice of rearing bird (ducks ,geese, turkey) for egg production and chicken meat.

Improved poultry breeds are developed on crossing between Indian (indigenous, for example, Aseel) and foreign (exotic, for example, Leghorn) breeds to produce layers for eggs and broilers for meat.

Layers- They are egg laying birds. They are fed with high fibre content.eg grit of stones for calcium and grains for fibre.

Broilers: These are the birds raised for meat production. They require high protein and fat and vitamin A and K rich diet.

The following practices are needed to take care of for birds-

1. Hygienic conditions in housing.-proper sanitation and spraying of disinfectants.

2. Protection form diseases-they suffer from diseases caused by virus,bacteria,fungi.

3 .Management of temperature.

COMMON MANAGEMENT PRACTICES IN DAIRY AND POULTRY FARMING-

1. Proper shelter ,its hygiene ,temperature 2. Proper Feed. 3. Prevention of control and diseases.

FISH PRODUCTION

There are two ways of obtaining fish.

Capture fishing: The ways of obtaining fish using both marine and freshwater with the help of boats and nets, which is called capture fishing.

Culture fishery: The cultivation of selected fishes in confined areas with utmost care to get maximum yield .

MARINE FISHERIES:- The practice of rearing and culturing marine fish, i.e. fish found in seas & oceans is called MARICULTURE. Tuna , cod, sardines, Bombay duck, pomphret, mackerel ,etc are common marine fish.

They are caught with the help of fishing nets from fishing boats in areas where there are large schools of fish. This can be determined using satellites and echo sounders

Fish farming is also done for some marine shelled and finned fish based on their economic value:-

Finned fish: - Bhetki, mullets & pearl spot. Shellfish: - Oysters (for pearls), mussels (mollusc)

INLAND FISHERIES:-

The practice of rearing and culturing fishes in fresh water sources include rivers, ponds, streams, canals, reservoirs, brackish water.

Brackish water is found in estuaries and lagoons where sea and fresh water mix.

Fish farming, both capture and culture done in such water bodies is called AQUACULTURE.

COMPOSITE FISH CULTURE:-

Rearing of fish in combination with rice crops so that fish grow along with paddy in the standing water.

Both local and imported varieties of fish can be used in such systems.

In such a system, 5/6 species of fish are selected and reared in a single fish pond.

The species are selected on the basis of their feeding habits, i.e. they should not compete for food and should not kill each other in the pond.

Fishes are at three levels- 1) Surface feeders- Catla 2) Middle zone- Rohu 3) Bottom feeders- Mrigals & carps

Advantages:-

1. Fish do not compete for food
2. Food available in different zones is utilized
3. Carps consume only aquatic weeds
4. Very high yield is obtained

Disadvantages of composite fish culture:-

1. Many fish breed only in the rainy season so hormonal stimulation has to be given.
2. Good quality seeds (i.e. organisms used for reproduction) are not available.

BEE KEEPING/APICULTURE

It is the practice of rearing/keeping, caring & management of honeybees on a large scale for obtaining honey & wax.

Honey is widely used & other products of bee-keeping are bee wax, bee venom, jelly.

APIARIES /BEE FARMS are places where the bees are raised for commercial honey production.

Common species of indigenous honey bee

1. Apis cerana indica - Indian bee
2. Apis dorsata- Rock bee
3. Apis floreae- Little bee

An exotic (foreign) Italian variety domesticated in India is - Apis mellifera as it has benefits like-

Exotic Italian variety are gentle in nature, sting less, high honey collecting capacity & stay in the beehive for longer periods.

IMPORTANT CONSIDERATIONS FOR GOOD QUALITY & YIELD OF HONEY-

1. Quality of Pasturage (flowers available to bees for nectar)
2. Quantity of pasturage
3. Location of apiary is within 1- 2km radius of pasturage