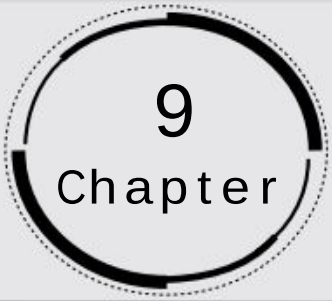
# Strategies for Enhancement in food production




**1. Explain in brief the role of animal husbandry in human welfare.**

**Ans:**

(i) Animal husbandry deals with the practice of raising, breeding and scientific management of livestock which includes various aspects such as feeding, breeding, and controlling diseases to raise the population of animal livestock.

(ii) It deals with the animals such as buffaloes, cattle, pigs, sheep, poultry, and fish which are useful for humans in various ways.

(iii) For the production of commercially important products such as milk, meat, wool, egg, honey, silk, etc, these animals are used.

(iv) As the human population increases, the demand for the products from livestock. Thus, the improvement in the management of livestock is needed .

**2. If your family owned a dairy farm, what measures would you undertake to improve the quality and quantity of milk production?**

**Ans:**

(i) The process and system to increase the yield and to improve the quality of milk are involved in dairy farm management.The yield of the milk is basically dependent on choosing improved cattle breeds, provision of proper feed for cattle, maintaining proper shelter facilities, and regular cleaning of cattle .

(ii) Improved cattle breed is a crucial factor of cattle management. Hybrid cattle breeds are introduced for improved productivity. Thus, hybrid cattle breeds should have a combination of various desirable genes including high milk production and high resistance to diseases.

(iii) Cattle should be provided with high quality and nutritious food including roughage, fibre concentrates, and high levels of proteins and other nutrients.

(iv) Cattle should be kept in well ventilated and illuminated comfortable chambers in proper cattle-houses in order to prevent them from bad climatic conditions such as heat, cold, and rain.

(v) Thus, to control diseases regular baths and proper brushing should be ensured. Also, regular checkups should be done by a veterinary doctor for symptoms of various diseases.

**3. What is meant by the term 'breed'? What are the objectives of animal breeding?**

**Ans:** Improved variety of animals within a species is called a breed. There is similarity seen in most of its characters such as general appearance, size, configuration, and features with other members of the same species.

For example- In the foreign breeds of cattle such as Jersey and Brown Swiss, these two varieties of cattle have the ability to produce abundant quantities of milk which is nutritious with high protein content.

Objectives of animal breeding are:

(i) To develop the new crop varieties superior to the existing ones in relation to their economic use.

(ii) To increase the yield of economic produce.

(iii) The best and cheapest method is to grow disease-resistant varieties of animals.

**4. Name the methods employed in animal breeding. According to you, which of the methods is best? Why?**

**Ans:** An important aspect of farming is animal breedi ng. It is the method of mating used when breeding occurs between members of the interrelated individuals. Several methods are involved in animal breeding, which can be classified into the following categories:

(i) Natural methods:

It is the method involving inbreeding and out-breeding. Breeding which occurs between animals of the same breed is known as inbreeding, while breeding between animals of different breeds is known as out-breeding.

Out-breeding of animals is of three types:

→ Out-crossing: It is the method of mating of animals within the same breed with no common ancestors on either side up to 4-6 generations.

→ Cross-breeding: In this type of out-breeding, the superior males of one breed are mated with superior females of another breed. The desirable qualities of two different breeds are allowed.

→ Interspecific hybridization: It is the mating between male and female animals of two different species.

(ii) Artificial methods of breeding involves modern techniques of breeding, which are of two types:

→ Artificial insemination: It is a process followed by collection of semen (collected from the male) into the oviduct or the uterus of the female body by the breeder. Various problems faced in abnormal mating can be overcomed by this method of breeding.
→ Multiple ovulation embryo technology (MOET): It is a technique in which super-ovulation is induced by a hormone injection for the improvement of the cattle. Then, fertilization is completed by artificial insemination and early embryos are collected. Each of those embryos are then transplanted into the surrogate mother for further development of the embryo. Artificial method of breeding is one of the best methods to carry out animal breeding, which includes artificial insemination and MOET technology. These technologies are scientific in nature. Certain problems of normal mating can be minimized and have a high success rate of crossing between mature males and females. Also, the production of hybrids with the desired qualities can be ensured. From the male, a small amount of semen can be used to inseminate several cattle as semen is not destroyed. Therefore, it is highly economical.

**5. What is apiculture? How is it important in our lives?**

**Ans:** The practice of bee-keeping for the production of various products such as honey, bee's wax, etc. Honey is the oldest sweetening agent since our civilization.

- It is a natural health tonic and tasty product which has been used in Ayurveda and Unani medicines.
- Wax is also created by honey bees which is used in domestic articles. It is also used for making cosmetics, polishes, used as the base in medicinal ointments.
- As demand for honey is increasing, people have started practicing bee-keeping on a large scale. Honey requires low investment and is labour intensive, great economic value for farmers.

**6. Discuss the role of fishery in enhancement of food productio n.**

**Ans:**

- Fishery is a crucial industry involving catching, processing, and marketing of fishes and other aquatic animals that have a high economic value.
- Few commercially important aquatic animals are prawns, crabs, oysters, lobsters, and octopus.
- An important role is played by the fishery in the Indian economy. This is because it is an important and easily available source of animal

protein, it is easily digestible and highly nutritious thus a large section of the Indian population is dependent on it.

- Through fishery, employment is generated, especially for the people staying in the coastal areas. Marine fishes (such as tuna, mackerel pomfret, etc.) Freshwater fishes (such as Catla, Rohu, etc) and both are of high economic value.

**7. Briefly describe various steps involved in plant breeding.**

**Ans:** The objective of plant breeding is to develop new crop varieties superior to the existing ones in relation to their economic use. It will give better yield and is disease resistant. It involves the following steps:

(i) Collection of variability: Genetic variability from various wild relatives of the cultivated species is collected to maintain the genetic diversity of a species. The entire collection of all the genes in a population of a plant is called the germplasm collection.

(ii) Evaluation of germplasm and selection of parents: The collected germplasm is then evaluated for the desirable genes. The plants with desirable and useful characteristics are chosen and used as parents in plant breeding experiments and are further multiplied by the process of hybridization whereas those with undesirable characteristics are hence eliminated.

(iii) Cross-hybridization among the selected parents: The next step in plant breeding is to combine the characters from different parents into one to produce hybrids. It is the most important step as one has to ensure that the mature and viable pollen grains collected from the male parent reaches the receptive stigma of the desired emasculated female parent.

(iv) Selection of superior hybrids: The choice process requires careful scientific evaluation of the progeny. The progenies of the hybrids with desirable combinations of characters are selected through scientific evaluation. The selected progenies are grown for several generations by allowing only self pollination to ensure homozygosity.

(v) Testing, release, and commercialization of new cultivars: The new varieties thus developed skilled rigorous testing. The yields, disease resistance, nutritional qualities, etc. are first evaluated by growing the developed cultivars in experimental fields and therefore the records are faithfully maintained. Once it certifies that the cultivar has passed all the essential requirements, the cultivar is commercialized.

**8. Explain what is meant by biofortification.**

**Ans:**

(i) A method of breeding crops with higher levels of vitamins, minerals, proteins, and fat content is called biofortification.
(ii) This method is used to enhance public health Breeding of crops with improved nutritional quality is undertaken to enhance the content of proteins, oil, vitamins, minerals, and micronutrients in crops.
(iii) It is additionally undertaken to upgrade the quality of oil and proteins. An example of this is often a wheat variety referred to as Atlas 66, which has high protein content in comparison to the existing wheat. Additionally, there are several other improved sorts of crop plants like rice, carrots, spinach etc. which have more nutritious value and contain more nutrients than the existing varieties.

**9. Which part of the plant is best suited for making virus-free plants and why?**

**Ans:** The apical and axillary meristem of plant is used for making virus-free plants. This region is the only region which is not affected in a diseased plant, as compared to the rest of the other regions. Hence, the axillary and apical meristems of the diseased plant was removed by the scientists and it was grown in vitro to obtain a disease-free and healthy plant.
Some of the virus free plants like maize, sugarcane, and potato have been obtained by this method by the scientists.

**10. What is the major advantage of producing plants by micropropagation?**

**Ans:** Micropropagation is a method of rapid vegetative multiplication by cell, tissue, or organ culture. Thus, new plants are produced in a short duration using plant tissue culture. Major advantages of micropropagation are as follows:
(i) Besides production of genetically identical plants, micropropagation helps in the propagation of large numbers of plants in a short span of time.
(ii) The produced plants are identical to the mother plant.
(iii) Thereby, it results in the production of healthier plantlets, which exhibit better disease-resisting powers.

**11. Find out what the various components of the medium used for propagation of an explant in vitro are?**

**Ans:** The carbon sources like sucrose, inorganic salts, vitamins, amino acids, water, agar-agar, and certain growth hormones such as auxins and gibberellins are the components of the medium used for propagation of an explant in vitro.

**12. Name any five hybrid varieties of crop plants which have been developed in India.**

**Ans:** The five hybrid sorts of crop plants developed in India are:

| **Crop Plant** | **Hybrid Variety** |
|---|---|
| Wheat | Sonalika and Kalyan sona |
| Rice | Jaya and Ratna |
| Cauliflower | Pusa Shubhra and Pusa snowball K-1 |
| Cowpea | Pusa Komal |
| Mustard | Pusa Swarnim |