9. Strategies for Enhancement in Food Production

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

Answer: Animal husbandry is defined as the agricultural practice of breeding and raising livestock. Poultry such as chicken, duck, quails, etc are reared for eggs and meat. Animals such as cows and buffaloes are reared for milk. Goats are reared for milk and meat and sheep are reared for meat and wool. Animal husbandry can be carried out as a side occupation along with agriculture as it is cost effective with high-profit returns. In this way, animal husbandry has contributed to human welfare.

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

Answer: Dairy farm management deals with processes which aim at improving the quality and quantity of milk production. Milk production is primarily dependent on choosing improved cattle breeds, provision of proper feed for cattle, maintaining proper shelter facilities, and regular cleaning of cattle.

Choosing improved cattle breeds is an important factor of cattle management. Hybrid cattle breeds are produced for improved productivity. Therefore, it is essential that hybrid cattle breeds should have a combination of various desirable genes such as high milk production and high resistance to diseases. Cattle should also be given healthy and nutritious food consisting of roughage, fibre concentrates, and high levels of proteins and other nutrients.

Cattle's should be housed in proper cattle-houses and should be kept in well ventilated roofs to prevent them from harsh weather conditions such as heat, cold, and rain. Regular baths and proper brushing should be ensured to control diseases. Also, time-to-time check-ups by a veterinary doctor for symptoms of various diseases should be undertaken.

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

Answer: The term 'breed' refers to a group of animals that are related to each other by means of descent and are similar in most of their characteristics characters like general appearance, features, size, configuration etc. Different breeds can be improved via processes of animal breeding The term animal breeding is the production of improved breeds of domesticated animals by improving their genotypes through selective mating.

Objectives of animal breeding

The process of animal breeding is carried out keeping in mind certain specific objectives as per the demand of breeders. Some of the main objectives of animals breeding are as follows:

1. For improving the growth rate
2. For increased production of milk, meat, egg, wool etc
3. For obtaining a superior quality of milk, meat, eggs, wool etc
4. For improving the resistance to various diseases
5. To increase productivity as well as reproductivity

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

Answer: Different methods of animal breeding are: inbreeding, out-breeding, out-crossing, cross-breeding and interspecific hybridisation.

Out of these methods, the best breeding method is of out-crossing because it increases the milk production and growth rate of beef cattle. Even a single outcross often helps to overcome the problem of inbreeding depression.

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

Answer: Apiculture is the rearing and breeding of honeybees for the production of honey . It is important in our live as honeybees provide honey, which is a highly nutritive substance and beeswax is used in many industries. Honeybees also pollinate flowers of some very important plants like sunflower, apple, pear.

Importance of Apiculture:

- The honey obtained from bees is used by human beings because of its food and medicinal value.
- Honey is also used in the preparation of bread, biscuits, cakes, alcoholic drinks and as fish and poultry food.
- Bee wax obtained is used in the manufacture of cosmetics, paints, face creams, ointments, insulators, polishes and for laboratory microtomy.
- It provides job opportunities.
- In addition to these, bees perform natural cross pollination which leads to an increase in yield of plant products due to hybridization. This is useful in agriculture and horticulture.

Question 6. Discuss the role of fishery in the enhancement of food production.

Answer: Fishery is an industry which deals with catching, processing, and marketing of fishes and other aquatic animals that have a high economic value. Some commercially important aquatic animals are prawns crabs, oysters, lobsters, and octopus. Fisheries play an important role in the Indian economy. This is because a large part of the Indian population is dependent on fishes as a source of food, which is both cheap and high in animal protein. A Fishery is an employment generating industry especially for people staying in the coastal areas. Both fresh water fishes (such as Catla, Rohu, etc) and marine fishes (such as tuna, mackerel pomfret, etc.) are of high economic value.

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

Answer: The various steps involved in plant breeding are:

- Collection of variability: It involves collection of variability of the species
- Evaluation and selection of parents: It involves selecting individual plants having the best desirable characters from the genetically mixed population. Pure lines are created consisting of individuals which are all homozygous with negligible phenotypic variations. The selected plants are used in hybridization.
- Hybridization: It is one of the most important methods of plant breeding. It involves producing new varieties of crops with desirable combination of characters by crossing two or more parents having unlike genetic constitution.
  For example, suppose a variety of rice has a high yield and good quality but has poor disease resistance capacity. There is another variety of rice which maybe poor in yield and quality but has high disease resistance. It is the objective of hybridization to create a progeny such that the good traits be incorporated into one progeny and the hybrid thus formed shows the desired combination of good traits (e.g. good quality, high yield and higher disease resistance power) which is then multiplied for commercial use.
- Selection and testing of recombinants: Plants having desirable characteristics are selected at every generation
- Testing, release and commercialization: Evaluation of the newly selected lines is carried out in terms of the yield (both qualitatively and quantitatively), disease resistance and other agronomic traits. This is followed by testing in the fields and its comparison with the local crop is done after which it is allowed to be released.

Question 8. Explain what biofortification is?

Answer: Biofortification is the idea of breeding crops to increase their nutritional value. This can be done either through conventional selective breeding or through genetic engineering. Increasing nutritional requirements of growing population has increased the need for biofortification.

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

Answer: Apical and axillary meristem of plant is free from virus. Thus, we can remove the meristem and grow it in vitro to obtain virus-free plants. Meristems of banana, sugarcane, potato have been cultured to produce virus-free plants.

Question 10. What is the major advantage of producing plants through micropropagation?

Answer: Micro propagation: It is the practice of rapidly multiplying stock plant material to produce a large number of progeny plants, using modern plant tissue culture methods. Advantage of micro propagation are following: (i) The main advantage of micropropagation is the production of many plants that are clones of each other. (ii) Micro propagation can be used to produce disease free plants. (iii) It is the only viable method of regenerating genetically modified cells or cells after protoplast fusion.

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

Answer: The major components of medium used for propagation of explants in vitro are carbon sources such as sucrose, inorganic salts, vitamins, amino acids, water, agar-agar, and certain growth hormones such as auxins and gibberellins.

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

Answer: Sonalika (wheat), Jaya (rice), Pusa shubra (cauliflower), Pusa komal (cowpea) and Pusa swarnim (mustard) are the hybrid vareity of crop plant which have been produced in India.