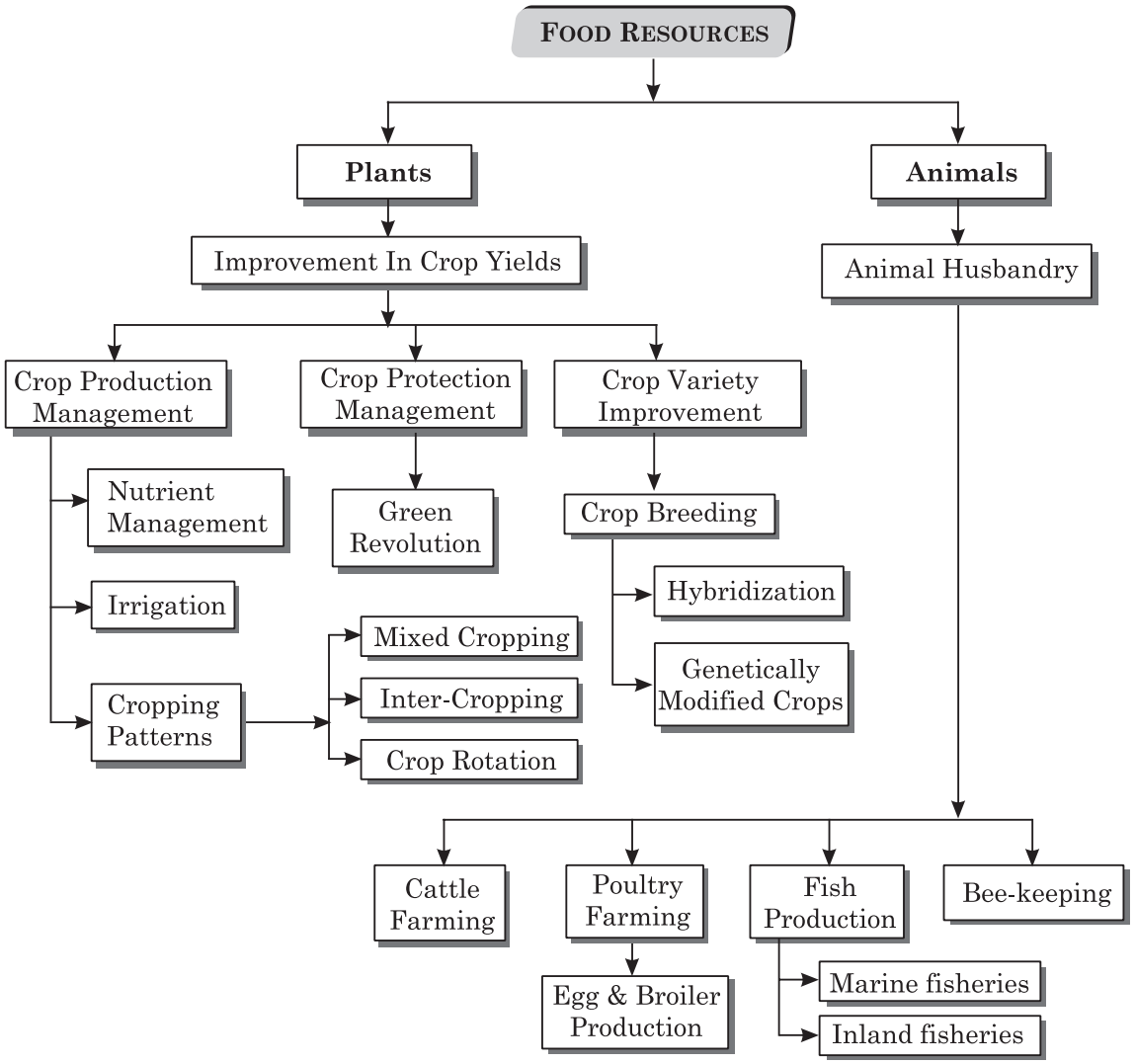
15 Improvement in Food Resources

Topics Covered

CHAPTER MAP



Quick Revision Notes

- Food provides nutrients which are required for our health and growth.
- Both plants and animals are sources of food.
- All living organisms need carbohydrates, fats, proteins, vitamins and minerals for their growth and development.
- Plants require C, H and O to make their food. Animals take these nutrients directly or indirectly from water and CO_2.
- There are 13 essential nutrients for crops that they take from soil. Six are **macro-nutrients** which are required in large amount and another seven which are needed in small amount are called **micro-nutrients**.
- P, K, Ca, Mg, S, N are macro-nutrients whereas Fe, Mn, B, Zn, Cu, Mo and Cl are micro-nutrients.
- **Manure** and fertilisers are the major sources of nutrients.
- **Manures** are of three types: (*i*) Compost, (*ii*) Vermi compost, (*iii*) Green manure.
- Fertilisers are inorganic substances which may harm the soil if used in excess whereas manure are organic substances, eco-friendly and do not harm the soil.
- Organic farming uses minimum fertilisers, herbicides, insecticides etc. with maximum amount of organic manure which is recycled from wastes and bio-agents.
- Cereals, seeds, pulses, vegetables, spices and fruits are different types of crops.
- **Kharif crop** grows during rainy season (June to October), e.g. black gram, green gram, pigeon pea, rice, paddy, soyabean.
- **Rabi crop** grows during winter season (November to April), e.g. wheat, gram, peas, mustard, linseed.
- Approaches to enhance the crop yield (amount) involves, (*i*) Crop variety improvement, (*ii*) Crop production improvement, (*iii*) Crop protection improvement.
- **Crop protection improvement** is done by pest control during growth and storage of grains (Both biotic and abiotic problems to be solved).
- Growing two or more crops in different rows pattern is called **intercropping**.
- The growing of different crops on a piece of land in a pre-plannned succession is called *crop-rotation.*
- **Crop variety improvement** is required for high yield, good quality, biotic and abiotic resistance, shortening the maturity duration, wider adaptability and desirable characteristics.
- Nutrition management, Irrigation and cropping patterns are needed to improve crop production.
- **Hybridization** is a process of crossing between two or more genetically dissimilar plants to produce new variety with new properties of both the crops.
- Wells, dug wells, tube wells, canals river lift system, tanks, rain water harvesting are the various methods of irrigation.
- Drying, maintenance of hygiene, fumigation, storage devices should be used for storage and future use.
- **Mixed farming** includes crop production along with raising of livestock.
- **Animal husbandary** is a scientific way of management of domestic animals in an efficient manner to obtain food and other useful products from them.
- Cattle farming is done to get milk, for ploughing fields, bull cart or horse cart for transportation.
- Cows and buffaloes are milch animals which give milk.
- Draught animals do not give milk but used for labour like agricultural work.

- Cleanliness, food and prevention of diseases are needed for the care of the cattles.
- Poultry farming is done for eggs and meat. They both provide protein to our diet.
- In **broilers** farming birds are raised for obtaining meat.
- In **layers** farming birds are raised for getting eggs.
- Most of the broilers and layers are cross breeded.
- Fish production are of two types: Fish production (Finned fish production) which involves bony fishes whereas Unfinned fish production involves shell fish such as prawns and molluscs.
- Capture fishing, Culture fishing, Marine fishing, Inland fishing and Composite fish culture are different ways in the fish production.
- **Blue revolution** means increase in fish production.
- **Bee-keeping** or setting of Apiary is a practice of keeping, caring and management of honey bees on a large scale for the production of honey and wax.
- Indian variety of bee are (*Apis cerana indica*), *A. odorsata* (rock bee) and floral (little bee).
- Italian variety '*A. mellifera*' is used in India for the large scale production.
- Pasturage is to make the availability of flowers to bees for the collection of nectar and pollen.
- Almond Honey of Kashmir is very tasty.

1. Improvement in Crop Yields

Crop Production

Crops are cultivated by human beings for their food and fodder for cattles.

Green Revolution: These are the practices which are used to increase crop production by using modern technology, proper irrigation techniques, improved seeds etc.

Types of crops:

- **Cereals:** Crops like wheat, rice, maize, barley, oats are cereal crops. They provide us carbohydrates.
- **Seeds:** Edible seeds include cereals, pulses, oil like groundnut, soya, sunflower, rice bran, olive, mustard, etc. These provide us fat.
- **Pulses:** These include legumes such as gram, pea, black gram, green gram, lentil. These provide us proteins.
- **Vegetable, spices and fruits:** These provide us minerals and vitamins. Fruits include mango, apple, banana, guava, cherry, muskmelon, watermelon etc. Vegetables include spinach, fenu greek, cauliflower, carrot etc. Spices include turmeric, pepper, cumin seeds etc.
- **Fodder crops:** Berseem, oats or sudan grass are raised for the food of cattles.

Photo periods: These are the periods for which plant is exposed to sunlight. Growth of the plants and its flowering depend upon the duration of sunlight.

Crop Variety Improvement

- It involves selection of a crop variety which gives good yield.
- Crop should be selected on the basis of disease resistance, response to fertilisers, product quality and high yielding capacity.

Hybridisation is used for incorporating desirable characteristics by crossing between genetically dissimilar plants. These are of three kinds:

- **Inter varietal:** It is the crossing between different varieties of crops.
- **Inter specific:** It is the crossing between different species of the same genus of a crop.
- **Inter generic:** It is the crossing between different genera.

GM (Genetically modified) crops: It is a way of improving crops by introducing a gene that would provide the desired characteristic.

Variety of seeds: Farmers should be provided good quality of seeds. They should be of same variety and should germinate under identical conditions.

Cultivation Practices and crop yield are related to:

- Weather
- Soil quality
- Availability of water, rainfall (monsoon unpredictable)
- Floods and droughts which are unpredictable.
- Diverse climate conditions.
- Soil salinity and tolerance of crop variety to the soil salinity.

Some factors for variety improvement are as follows:

Higher yield: It is done to increase crop production per hectare.

Improved quality: Baking quality is important in wheat, protein quality in pulses, oil quality in seeds and preserving quality in fruits and vegetables.

Biotic resistance: Biotic factors like insects, diseases, nematodes decrease the crop production.

Abiotic resistance: High salinity of soil, droughts, water logging, heat, cold, frost, stresses under different conditions are the important abiotic factors.

Varieties resistant to such factors stresses can improve crop production.

Change in maturity duration:

- Shorter the duration between sowing and harvesting, more economical is the variety as it reduces cost of production.
- Multiple round of crops can be grown in a year.
- Uniform maturity also helps to reduce losses during harvesting.

Wider Adaptability: Crops should be able to adapt in different environmental conditions.

Desirable agronomic characteristics: Tallness and profuse branching are desirable for fodder crops.

Dwarfness is desirable in cereal crops, so less nutrients are consumed by crops.

Thus developing varieties of desired characteristics will help to give higher productivity.

Exercise 15.1

I. Very Short Answer Type Questions (1 Mark)

1. Name one oil yielding crop. [*NCERT*]
2. Which one is not a source of carbohydrate?
   (*a*) Rice (*b*) Millets (*c*) Sorghum (*d*) Gram [*NCERT*]
3. Find out the wrong statement from the following:
   (*a*) White revolution is meant for increase in milk production
   (*b*) Blue revolution is meant for increase in fish production
   (*c*) Increasing food production without compromising with environmental quality is called as sustainable agriculture
   (*d*) None of the above [*NCERT Exemplar*]
4. To solve the food problem of the country, which among the following is necessary?
   (*a*) Increased production and storage of food grains
   (*b*) Easy access of people to the food grains
   (*c*) People should have money to purchase the grains
   (*d*) All of the above [*NCERT Exemplar*]

5. Find out the correct sentence
   (*i*) Hybridisation means crossing between genetically dissimilar plants
   (*ii*) Crossing between two varieties is called as inter specific hybridization
   (*iii*) Introducing of genes for a desired character into a plant gives genetically modified crop
   (*iv*) Cross between plants of two species is called as inter varietal hybridisation
   (*a*) (*i*) and (*iii*) (*b*) (*ii*) and (*iv*)
   (*c*) (*ii*) and (*iii*) (*d*) (*iii*) and (*iv*) [*NCERT Exemplar*]
6. Name two fodder crops.
7. What is the time of rabi crops?
8. There was a bumper increase in crop production of food grains especially wheat in 1970. What was the name of this revolution?
9. What is yellow revolution?
10. Give one example each of Kharif and Rabi crop.
11. What are photoperiods?
12. What is meant by inter-specific crossing?
13. What is inter-generic crossing?
14. Why do we need food?
15. What is the main source of irrigation in India?
16. What is HYV?

II. Short Answer Type Questions–I (2 Marks)

17. How do biotic and abiotic factors affects crop production? [*NCERT*]
18. Fill in the blanks
   (*a*) Pigeon pea is a good source of ———.
   (*b*) Berseem is an important ——— crop.
   (*c*) The crops which are grown in rainy season are called ——— crops.
   (*d*) ——— are rich in vitamins.
   (*e*) ——— crops grow in winter season. [*NCERT Exemplar*]
19. What is GM crop? Name any one such crop which is grown in India. [*NCERT Exemplar*]
20. Name some pulses which provides us proteins.
21. What is a Kharif season? Name few Kharif crops.
22. What are the desirable agronomic characteristics of crop production? [*NCERT*]
23. Shorter the duration between sowing and harvesting, the more economical is the variety Give reason.
24. Efforts are always being made to improve production from agriculture and animal husbandry. Why is this necessary?

OR

Why we cannot make do with the current levels of production?

25. 'Simply increasing grain production for storage in warehouses cannot solve the problem of malnutrition and hunger'. Discuss what should be done in order to save the food crisis in India?
26. In India there has been a four times increase in the production of food grains from 1952 to 2010 with only 25% increase in the cultivable land area. How has this increase in production been achieved?

III. Short Answer Type Questions–II (3 Marks)

27. Explain any one method of crop production which ensures high yield. [*NCERT*]
28. What do we get from cereals, pulses, fruits and vegetables? [*NCERT*]

29. What is sustainable agriculture? Why it should be practiced now that already we are able to achieve higher rates of food production in agriculture and animal husbandry?

IV. Long Answer Type Question (5 Marks)

30. List five objectives of Crop variety improvement.

Answers 15.1

1. Sunflower.
2. (*d*) Gram is source of protein.
3. (*d*) None of the above
4. (*d*) All of the above.
5. (*a*) (*i*) and (*iii*)
6. Berseem, Sudan grass (oats)
7. Winter Season (November to April)
8. Green revolution.
9. The increase in the production of oil seeds is called yellow revolution.
10. Rice is a Kharif and Wheat is a Rabi crop.
11. Photoperiod are the periods for which plant is exposed to sunlight. Growth of the plants and its flowering depend upon the duration of sunlight.
12. The crossing between different species of the same gene is called inter-specific crossing.
13. Inter generic is a crossing between crops of different genera.
14. Food provides us with energy to do work.
15. Rain is the main source of irrigation in India.
16. HYV stads for High Yield Variety.
17. **Biotic factors** like insects, diseases and nematodes decrease the crop production. Earth worms increase the crop production.
Abiotic factors like water, salinity, heat, cold, water logging affect the yield of crops.
18. (*a*) Proteins (*b*) Fodder
(*c*) Kharif (*d*) Fruits and vegetables (*e*) Rabi
19. GM (genetically) modified crops are the ones which are developed through the introduction of some specific genes from other sources. Insect resistant Bt Cotton, vitamin rich Golden rice are GM crops grown in India.
20. Gram, pea, black gram, pigeon pea etc.
21. Rainy season is called the Kharif season.
Paddy, Soyabean, Pigeon pea, Maize, Cotton, Green and black gram are a few Kharif crops.
22. Tallness and lot of branching in fodder crops.
23. By shorter duration between sowing and harvesting, the farmers can grow more number of crops, which will reduce the cost of production.
24. India is a very populous country. Our population is more than one billion people, and it is still growing. As food for this growing population, we will soon need more than a quarter of a billion tonnes of grain every year. This can be done by farming on more land. But India is already intensively cultivated. As a result, we do not have any major scope for increasing the area of land under cultivation. Therefore, it is necessary to increase our production efficiency for both crops and livestock.
25. This is because, people should have money to purchase food. Food security depends on both availability of food and access to it. The majority of our population depends on agriculture for their livelihood. Increasing the incomes of people working in agriculture is therefore necessary to combat the problem of hunger.

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.

26. Increase in production was made possible due to systematic progress in following aspects in the practices involved in farming, the major groups of activities for improving crop yields can be classified as:

(*i*) Crop variety improvement- the choice of seeds for planting- For new varieties of crops to be accepted, it is necessary that the variety produces high yields under different conditions that are found in different areas.

(*ii*) Crop production improvement–the nurturing of the crop plants

(*iii*) Crop protection management–the protection of the growing and harvested crops from loss.

27. Hybridisation helps to increase the crop production. It involves crossing of inter-variety, inter-specific, inter-generic crossing which give plants of desired characteristics, i.e. high yield of crops which are disease resistant and respond to fertiliser positively, adaptable to the environment, need less water for irrigation and have low maturity periods.

28. **Cereals** give us carbohydrates. **Pulses** give us proteins. **Fruits and vegetables** give us minerals and vitamins.

29. Increasing food production without compromising with environmental quality is called as sustainable agriculture.

There is a need for sustainable practices in agriculture and animal husbandry. 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.

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

(*i*) **Higher yield:** To increase the productivity of the crop per acre.

(*ii*) **Improved quality:** Quality considerations of crop products vary from crop to crop. Baking quality is important in wheat, protein quality in pulses, oil quality in oilseeds and preserving quality in fruits and vegetables.

(*iii*) **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. Varieties resistant to these stresses can improve crop production.

(*iv*) **Change in maturity duration:** The shorter the duration of the crop from sowing to harvesting, the more economical is the variety. Such short durations allow farmers to grow multiple rounds of crops in a year. Short duration also reduces the cost of crop production. Uniform maturity makes the harvesting process easy and reduces losses during harvesting. Wider adaptability: Developing varieties for wider adaptability will help in stabilising the crop production under different environmental conditions. One variety can then be grown under different climatic conditions in different areas.

(*v*) **Desirable agronomic characteristics:** Tallness and profuse branching are desirable characters for fodder crops. Dwarfness is desired in cereals, sothat less nutrients are consumed by these crops. Thus developing varieties of desired agronomic characters help give higher productivity.

2. Crop Production Management

- Economic conditions of a farmer decides the farming practices and agricultural technology to be followed by him.
- Higher the inputs, higher the yield (amount of crop obtained).
- Purchasing power of farmer to add inputs decides the cropping system and production practices like **no cost**, **low cost** and **high cost**.

Nutritional Management

It is a science which directs the link of all resources required to raise food, i.e. crop for all living beings and their nutrients to optimal efficiency.

Nutrients: The substances which are needed by pants for proper growth and development are called nutrients.

- Nutrients are supplied to plants by air, water and soil.

Essential Nutrients: There are 16 nutrients which are essential for the proper growth and development of plants.

- Air supplies carbon and oxygen.
- Hydrogen comes from water.
- Soil supplies remaining nutrients like N, S, P, K, Ca, N etc.

Macro-nutrients: These nutrients are needed in large amounts, e.g. Nitrogen, Phosphorus, Potassium, Calcium, Magnesium and Sulphur. They make the plant body apart from being useful in proper functioning of plant.

Micro-nutrients: These nutrients are needed in small amounts, e.g. Iron, Manganese, Zinc, Boron, Copper, Molybdenum, Chlorine. They may be required for proper functioning.

- Deficiency of any of these nutrients affects the bio-chemical processes in plants including reproduction, growth and susceptibility to diseases, etc.
- These nutrients can be supplied in the form of manure and fertilisers.

Manure

- It contains large quantity of organic matter and also supplies small amount of nutrients to the soil. They help in general growth of plant.
- These are obtained from decomposition of cow dung, animals excreta and plant wastes.
- It helps in enriching the soil with nutrients and organic matter thereby increasing the soil fertility.
- It helps in improving the soil structure and water holding capacity in sandy soil. In clayey soils, it helps in drainage and in avoiding water logging.
- It is the best way to use biological wastes which protects environment from excessive use of fertilisers. It is prepared by farmer in the field itself.
- It helps in recycling of waste materials and reducing the cost of production.
- It has long term benefits.

There are different types of manure depending upon the biological material used.

- **Farm Yard Manure (FYM)** is formed by decomposition of animal excreta like cow dung, kitchen waste, plant remains, waste food etc.
- **Compost** use livestock excreta, vegetable waste, animals refuse, domestic waste, sewage waste, straw, uprooted weeds etc. These are all decomposed in a pit. It is covered with mud.
- **Vermicompost:** It is a process in which compost is prepared with the help of earthworms or red worms to speed up the process of decomposition.

- **Green Manure:** Some plants like sunn hemp or guar are grown and mulched by ploughing them into the soil. They decompose in soil only. These plants turn into green manure which helps in enriching the soil with nitrogen and phosphorus.

Fertilisers

These are chemicals which supply essential plant nutrients to the plants like nitrogen, phosphorus, potassium, calcium. They fulfil specific nutrient repairments of plant.

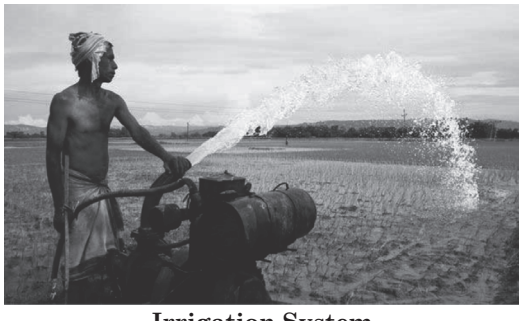
- These are used to ensure good vegetative growth (leaves, branches, flowers), giving rise to healthy plants.
- They are manufactured in the factories and need to be bought by the farmer.
- It involves high cost farming but gives better and higher yield.
- These should be added in proper doses and at proper time by carefully observing the pre and post application, e.g. excessive irrigation washes away fertilisers and plants do not get it and water gets polluted.
- Continuous use of fertiliser in a particular area for a long time destroys the soil fertility because organic matter is not regenerated and helpful micro-organisms are destroyed.
- These have short term benefits.

Organic Farming

- It is a farming method in which fertilisers, pesticides, insecticides are not used or used to minimum extent. Product of one activity is useful in other activity.
- It uses maximum organic manure, recycled farm waste using blue green algae (bio-agents) in the preparation of bio-fertilisers.
- Neem leaves, turmeric are used in grain storage as bio-pesticides with healthy cropping systems like mixed cropping, inter-cropping and crop rotation.
- These cropping systems are beneficial in insect, pest and weed control besides providing nutrients.

Irrigation

- Most of the agricultural practises in India depend upon rain. If monsoon is good, and timely agriculture production becomes high.
- Wells, canals, rivers, tanks, ponds, tube wells are the different sources of water.

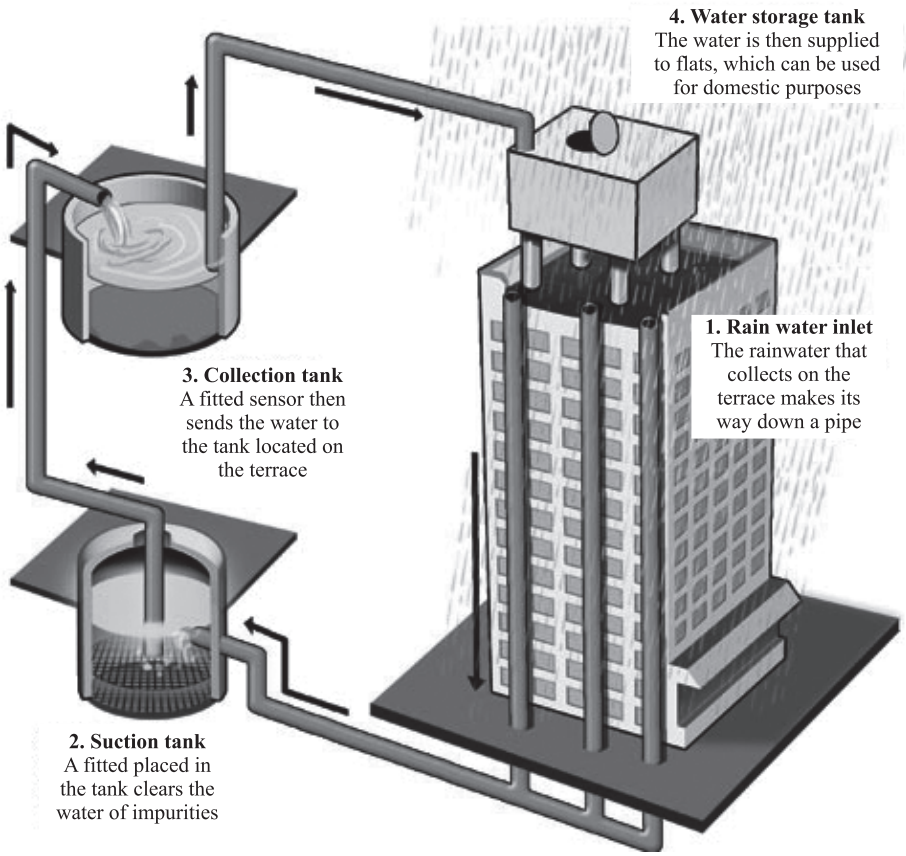


Irrigation System

River lift system: The places where canal flow is irregular and slow, water is drawn from the rivers directly for supplementing irrigation in the area close to rivers.

Tanks: These are small storage reservoirs which store rainwater, which can be used by small catchment area.

Rain water harvesting and **water shed management** involves building of small check dams which leads to increase in ground water level. The check dams stops the rainwater from flowing away and thus prevents soil erosion.



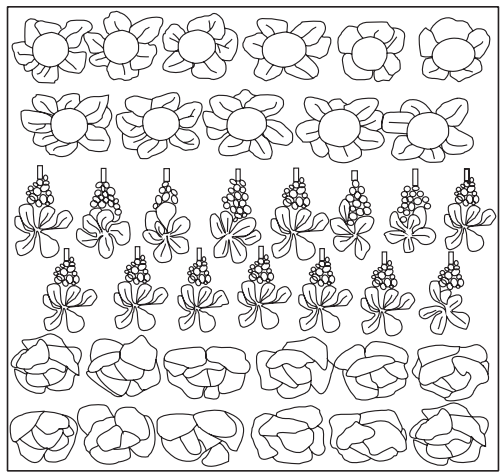
Cropping Patterns

Different ways of growing crops which gives maximum benefits are:

Mixed Cropping: It is a process of growing two or more crops simultaneously on the same piece of land, e.g. wheat + gram, wheat + mustard or groundnut + sunflower. This reduces risk and gives more benefits, if there is failure in any one of the crops, due to weak monsoon, other will survive.

Intercropping: It is a pattern of growing two or more crops simultaneously on the same field in a definite pattern as shown in the diagram.

- A few rows of one crop alternate with few rows of the second crop, e.g. soyabean + maize or finger millet (bajra) + cow pea(lobia).
- The crops are selected such that their nutrient requirements are different.
- It prevents pests and diseases from spreading to all the plants belonging to one crop in the field and reduces loss of both the crops and give better results.



Intercropping

Crop-rotation: The growing of different crops on a piece of land in a pre-planned succession is called **crop-rotation**.

- Choice of crops is decided on the availability of irrigation facility and moisture.
- Two or three crops can be grown in a year with good harvest by this process.

Crop Protection Management

If the protection of crops from weeds, insects, pests and diseases is not controlled at the appropriate time then they can damage the crops to that extent that most of the crop is lost.

Weeds are unwanted plants which grows along with the crops and take up the of nutrients thereby reducing the growth of the crops, e.g. Xanthium (*gokharoo*), Parthenium (*gajar ghas*), *Cypernus rotundus* (*motha*) compete for food, space and light with the crops. These can be removed manually or by using chemicals called **herbicides**. Some weeds harbour pathogen which can spread diseases in plants.

- Weed control methods are mechanical removal, proper seed bed preparation, timely swing of crops, inter-cropping, crop-rotation.
- Insects harm the crops and reduce the yield. **Insecticides** are used to destroy them.
- Diseases in plants caused by bacteria, fungi and virus through soil, air and water reduce the quality and quantity of crops.
- Pesticides, herbicides, fungicides are used to control diseases caused by bacteria, fungi and viruses.
- Pest resistant variety of seeds are developed and deep ploughing method are used to destroy weeds and pests.
- Excessive use of the above mentioned chemicals create problems by entering animal body and by causing environmental pollution.

Storage of Grains

There is a lot of loss of grains due to attack of insects, fungi, rodents, mites and bacteria (biotic factors) in improper storage place.

- Abiotic factors like moisture, extreme temperature in place of storage also spoil the crops. They cause degradation in quality, loss in weight, poor germinability, discolouration of the grain.

Preventive Measure

Drying: The food grains should be properly dried on polythene/water proof sheets on concrete floor in the sun to remove moisture. Covers should be used if sudden rain appears. The gain is dried fully to an extent that it cracks with a sound when pressed between the teeth.

Hygiene: No insects should be present in the produced grains. Clean warehouse or godowns should be used to store the crops. Cracks in the roofs, walls, floors must be sealed with plaster of paris or by suitable method to avoid leakage of moisture or entry of rodents.

Fumigation: Seeds should be treated with insecticides and fungicide. Neem leaves, garlic, turmeric can be used as insect repellents.

Storage devices: Clean air tight, moisture resistant and temperature resistant gunny bags for storage should be used and developed. They can also be put in bins, silos or large containers. They must be inspected from time to time.

Exercise 15.2

I. Very Short Answer Type Questions (1 Mark)

1. Weeds affect the crop plants by
   (*a*) killing the plants in the field before they grow
   (*b*) dominating the plants to grow
   (*c*) competing for various resources of crops (plants) causing low availability of nutrients
   (*d*) All of the above. [*NCERT Exemplar*]

2. Find out the correct sentence about manure
   (*i*) Manure contains large quantities of organic matter and small quantities of nutrients.
   (*ii*) It increases the water holding capacity of sandy soil.
   (*iii*) It helps in draining out of excess water from the clayey soil.
   (*iv*) Its excessive use pollutes the environment because it is made of animal excretory waste.
   (*a*) (*i*) and (*iii*) (*b*) (*i*) and (*ii*)
   (*c*) (*ii*) and (*iii*) (*d*) (*iii*) and (*iv*) [*NCERT Exemplar*]
3. Preventive and control measures adopted for the storage of grains include
   (*a*) strict cleaning (*b*) proper disjoining
   (*c*) fumigation (*d*) all of the above [*NCERT Exemplar*]
4. Which one of the following nutrients is not available in fertilisers?
   (*a*) Nitrogen (*b*) Phosphorus
   (*c*) Iron (*d*) Potassium [*NCERT Exemplar*]
5. List the purposes for which cattle are raised.
6. Name some exotic breeds of cattle

II. Short Answer Type Questions–I (2 Marks)

7. Why is organic matter important for crop production? [*NCERT Exemplar*]
8. If there is low rainfall in a village throughout the year, what measures will you suggest to the farmers for better cropping? [*NCERT Exemplar*]
9. Arrange these statements in correct sequence for the preparation of green manure.
   (*a*) Green plants are decomposed in the soil.
   (*b*) Green plants are cultivated for preparing manure or crop plant parts are used.
   (*c*) Plants are ploughed and mixed into the soil.
   (*d*) After decomposition it becomes green manure. [*NCERT Exemplar*] **[HOTS]**
10. Why is excess use of fertiliser is a determinantal for our environment? [*NCERT Exemplar*]
11. In agricultural practices, higher input gives higher yield. Discuss how? [*NCERT Exemplar*]
12. Why are manure and fertilisers used in fields? [*NCERT*]
13. Why should preventive measures and biological control methods be preferred for protecting crops? [*NCERT*]
14. Why is organic matter important for crop production especially for clayey soils?
15. List the purposes for which cattle are raised.
16. What is the reason that inspite of giving loans and free seeds to many farmers under so many schemes, crop yields in many parts of India has not increased much? How should our government face this challenge?
17. Ramdhan has planted soyabean maize followed by cowpea. This pattern is repeated in the whole field. You think, he is out of his mind? Why is he doing it?

III. Short Answer Type Questions–II (3 Marks)

18. Fill in the blanks:
   (*a*) Photoperiod affects the ————.
   (*b*) Kharif crops are cultivated from ———— to ————.
   (*c*) Rabi crops are cultivated from ———— to ————.
   (*d*) Paddy, maize, green gram and black gram are ———— crops.
   (*e*) Wheat, gram, pea, mustard are ———— crops. [*NCERT Exemplar*]
19. Fill in the blanks:
   (*a*) A total of ——— nutrients are essential for the plants.
   (*b*) ——— and ——— are supplied by air to the plants.

(*c*) ——— is supplied by water to the plants.
(*d*) Soil supply ——— nutrients to the plants.
(*e*) ——— nutrients are required in large quantity and are called as ———.
[*NCERT Exemplar*]
(*f*) ——— nutrients are needed in a small quantity for plants and are called as ———.

20. Differentiate between compost and vermicompost. [*NCERT Exemplar*]

21. Define: (*i*) Vermicompost; (*ii*) Green manure; (*iii*) Bio fertiliser [*NCERT Exemplar*]

22. Discuss various methods of weed control. [*NCERT Exemplar*]

23. Cultivation practices and crop yield are related to the environmental conditions. Explain. [*NCERT Exemplar*]

24. Write the modes by which insects affect the crop yield. [*NCERT Exemplar*] **[HOTS]**

25. What are macro nutrients and why are they called macronutrients? [*NCERT*]

26. How do plants get nutrients? [*NCERT*]

27. What factors may be responsible for the loss of grains during storage? [*NCERT*]

28. What is genetic manipulation? How is it useful in agricultural practices? [*NCERT*]

29. Give one word for the following:
(*a*) Farming without the use of chemicals as fertilisers, herbicides and pesticides is known as ———.
(*b*) Growing of wheat and groundnut on the same field is called as ———.
(*c*) Planting soyabean and maize in alternate rows in the same field is called as ———.
(*d*) Growing different crops on a piece of land in pre-planned succession is known as ———.
(*e*) Xanthium and Parthenium are the most common ———.
(*f*) Causal organism responsible for any disease is called as ———. [*NCERT Exemplar*]

30. Given below are some words and some blanks in the table. Fill the blanks with the given words:
cereals, pulses, pigeon pea (arhar), maize, spinach, castor, protein, soyabean, ground nut, green gram (moong), sesame, mustard, and sunflower, vegetables, lentil, linseed, orange (masoor), vitamins and minerals, turmeric, millets

Type of crop	Main Nutrient / Supplies	Examples
	Energy/carbohydrates	Wheat
Oil seeds	Fats	
		Gram (chana), pea (matar), black gram (urad)
Spices, fruits		

IV. Long Answer Type Questions (5 Marks)

31. Group the following and tabulate them as energy yielding, protein yielding, oil yielding and fodder crops.
Wheat, rice, berseem, maize, gram, oats, pigeon gram, sudan grass, lentil, soyabean, groundnut, castor and mustard. [*NCERT Exemplar*]

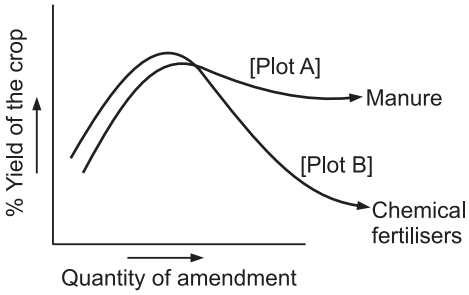
32. Discuss why pesticides are used in very accurate concentration and in a very appropriate manner? [*NCERT Exemplar*] **[HOTS]**

33. Figure shows the two crop fields [Plots A and B] which have been treated by manure and chemical fertilisers respectively, keeping the other environmental factors same. Observe the graph and answer the following questions.

(*i*) Why does plot B shows sudden increase and then gradual decrease in the yield?

(*ii*) Why is the highest peak in plot A graph slightly delayed?

(*iii*) What is the reason for the different pattern of the two graphs? [*NCERT Exemplar*] **[HOTS]**



34. Compare the use of manure and fertilisers in maintaining soil fertility. [*NCERT*]

35. What are the advantages of inter-cropping and crop-rotation? [*NCERT*]

36. Describe the types of loss caused by inappropriate conditions of moisture and temperature prevailing during storage of grains. [*CBSE* 2016]

37. (*a*) What is the difference between macro and micro nutrients?

(*b*) Classify plant nutrients into macro and micro nutrients.

(*c*) What will be the consequence of deficiency of these plant nutrient. [*CBSE* 2016]

38. Name some organisms causing diseases in Poultry.

39. What are different kinds of irrigation systems adopted to supply water to agricultural lands in Indian farms?

40. Though excessive use of chemical should be avoided to save the environment from being polluted but can we grow our crops without them? Discuss giving points two in favour and two against the motion. Can you suggest some solution to reduce the disadvantages?

Answers 15.2

1. (*d*) All of the above

2. (*b*) (*i*) and (*ii*)

3. (*d*) All of the above

4. (*c*) Iron

5. (*i*) Milk Production (*ii*) Agricultural work (*iii*) Meat production

6. Jersey, Holstein, Brown Swiss

7. Organic matter increases fertility of the soil. It helps in improving soil structure, water holding capacity of sandy soil, drainage and areation in clayey soil and helps in avoiding water logging. It provides nutrients to the plants. It enriches the soil during decomposition. Biochemicals present in organic matter improves the growth of the crop plants.

8. (*i*) Use nearby rivers directly, if available.

(*ii*) Use canals if available and river lift system if flow of water is slow.

(*iii*) Use tube wells, if possible.

(*iv*) Use tanks and ponds which can store rain-water.

(*v*) Reduce tilling.

(*vi*) Enrich the soil with humus.

(*vii*) Use of drought resistant variety of crops.

9. (*b*) → (*c*) → (*a*) → (*d*)

10. (*i*) Fertilisers kill useful bacteria and microorganisms of the soil.

(*ii*) It makes soil excessively acidic or basic which is not good for crops.

(*iii*) Soluble fertiliser creates water pollution.

(*iv*) There are short term benefits, but in long term it harms the soil.

11. (*i*) Higher yield variety seeds cost more.

(*ii*) Use of fertilisers, pesticides, insecticides, herbicides can increase yield of crops as well as cost of production.

(*iii*) Use of tractor for ploughing increases the cost but reduces the labour and improve the yield.

(*iv*) Use of combine harvester is best, but it is not economical.

12. Manure and fertilisers supply nutrients to the soil and increases the fertility of the soil and thus increases the production. They overcome the nutritional deficiency of the soil.

13. Resistant crops variety are useful and give higher yield. Biological control methods are safe, ecofriendly, long lasting and harmless to other forms of life, therefore should be preferred.

14. Manure contains large quantities of organic matter and also supplies small quantities of nutrients to the soil. The bulk of organic matter in manure helps in improving the soil structure. This involves 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. In using manure we use biological waste material, which is advantageous in protecting.

15. (*i*) Egg production (*ii*) Feather production (*iii*) Chicken meat

16. Most agriculture in India is rain-fed, that is, the success of crops in most areas is dependent on timely monsoons and sufficient rainfall spread through most of the growing season. Poor monsoons cause crop failure.

Many measures are being taken by government to bring more and more agricultural land under irrigation. Light soils have less water retention capacity. Scientists are developing some crop varieties which can tolerate drought conditions.

17. He is intelligent as he is practicing Inter-cropping. It is growing two or more crops simultaneously on the same field in a definite pattern. This ensures maximum utilisation of the nutrients supplied, and also prevents pests and diseases from spreading to all the plants belonging to one crop in a field. This way, all crops can give better returns.

The crops are selected such that their nutrient requirements are different. Cow pea and soyabean being legumes will make nitrates that will be used by maize. Ramdhan is also saving money on fertilizers and maintaining soil fertility as well.

The growing of different crops on a piece of land in a pre-planned succession is known as crop rotation. Depending upon the duration, crop rotation is done for different crop combinations. The availability of moisture and irrigation facilities decide the choice of the crop to be cultivated after one harvest. If crop rotation is done properly then two or three crops can be grown in a year with good harvests.

18. (*a*) Flowering of plants, (*b*) June to October, (*c*) November to April, (*d*) Kharif, (*e*) Rabi

19. (*a*) 16 (*b*) carbon and oxygen (*c*) Hydrogen
(*d*) 13 (*e*) Six, Macronutrients (*f*) Seven, Micronutrients

20.

Compost	Vermicompost
1. Farm waste, vegetable and animal waste, sewage waste are decomposed in a pit	1. It is prepared from domestic waste, vegetable refuse, weeds and farm refuse.
2. Organic materials are decomposed by micro-organisms	2. Earthworms are fed which changes the waste into vermicompost
3. It is a slow process, takes about 3 to 6 months	3. It gets ready within 1 or 2 months

21. (*i*) **Vermicompost:** It is prepared by organic wastes with the help of earthworms. It takes less time to become ready.

(*ii*) **Green manure:** It is made up from hemp or guar, green leaves mixed with soil, which upon decomposition, provides 'N' and 'P', organic matter; which protect against soil erosion and leaching.

(*iii*) **Biofertiliser:** It enriches the soil with nutrients. These are used for specific crops like pulses, legumes, oil seeds and rice. These are renewable, and non-polluting sources of nitrogen. They can act as supplement along with fertilisers, e.g. nitrogen fixing bacteria like Rhizobium, blue green algae, cyanobacteria, phosphate solublising micro-organism.

22. (*i*) **Mechanical method:** In this method weeds are removed manually using uprooting by hands, *khurpi*, scraping, inter-culture, ploughing, burning and flooding.

(*ii*) **Culture method:** In this method proper bed preparation, timely sowing of seeds inter-cropping and crop-rotation methods are utilised.

(*iii*) **Chemical method:** In this method chemicals called herbicides and weedicide are sprayed on weeds, e.g. 2, 4-D (Dichlorophenoxy acetic acid), Atrazine, fluchloralin, Isoproturon are used to remove weeds.

(*iv*) **Biological control:** This method involves deliberate use of insects or organisms which can consume and destroy weed plants.

23. Some crops need high or low temperature, larger or shorter duration of sunlight, more, less or moderate humidity and different types of soil. For an example

Apple can be grown only on hill stations with low temperature and high humidity. Snowfall increases their production. Rabi and Kharif crops are grown in plains.

24. Insects attack the plants in the following three ways:

(*i*) They cut the root, stem and leaf.

(*ii*) They suck the plant sap.

(*iii*) They bore holes into the stem and fruits.

- **Chewing insects** destroy all types of crops, e.g. locusts, grasshopper, catterpillar, etc.
- **Sucking insects** suck the plant sap from various parts of the plants, e.g. aphids, pyrilla, plant bugs like red cotton bug.
- **Internal feeders** live inside the plant body. They are called borers, e.g. Pod borer, cotton boll weevil, grain weevil, termites etc.

25. Those nutrients which are required by plants in large amounts are called **macro-nutrients**.

Nitrogen, Potassium, Phosphorus, Calcium, Magnesium and Sulphur are macronutrients. They are required by the plants in large amounts to carry out the various life processes and that is why, they are called macronutrients. They constitute the plant body.

26. Plants get C and O_2 from air, Hydrogen from water and remaining 13 nutrients from the soil. Some plants legumes get nitrogen directly from air. Nutrients obtained from soil are soluble in water and are absorbed by plants through roots and reach various part of plants through vascular system.

27. (*i*) Insects, e.g. grubs of pulse beetle, grubs and adults of rice weevil, wheat weevil, caterpillar of grain and flower moth, larvae and adult of rust red flour beetle, larva of rice moth.

(*ii*) Rodents like stripped squirrel, rats etc.

(*iii*) Birds like parakeet, sparrow, bulbul, blue rock, pigeon, crow.

(*iv*) Mites, fungi, bacteria all can spoil grains.

(*v*) Moisture, extreme temperature, unhygienic conditions may also spoil the grains.

28. The process refers to the transfer of genes from one organism to another, e.g. Bt Cotton is a genetically modified crop which carry bacterial genes, that protects this plants from insects. These are used in rice, maize, brinjal, cabbage, cauliflower to get protection from insects.

29. (*a*) organic farming, (*b*) mixed cropping, (*c*) Inter-cropping, (*d*) crop-rotation, (*e*) weeds, (*f*) pathogen

30.

Type of Crop	Main Nutrient / Supplies	Examples
Cereals	Energy / carbohydrates	Wheat, millets and maize
Oil seeds	Fats	Castor, ground nut, sesame, mustard, linseed and sunflower
Pulses	Protein	Gram (chana), pea (matar), black gram (urad) pigeon pea (arhar), soyabean, green gram (moong), lentil (masoor)
Spices, Fruits, Vegetables	Vitamins and minerals	Turmeric, spinach, orange

31.

Energy Yielding	Protein Yielding	Oil Yielding	Fodder Crop
Wheat	Pigeon gram	Soyabean	Berseem
Rice	Lentil	Groundnut	
Maize		Castor	Sudan grass
Oats	Sudan grass	Mustard	Oats

32. Pesticides are extremely harmful for the crop plants, therefore, their accurate concentration at an appropriate time must be used. Even slight excess is extremely harmful.

(*i*) They reduce the soil fertility.

(*ii*) They create water pollution.

(*iii*) They enter the crop plants and then enter the human and animal body and in the entire food-chain.

(*iv*) They harm aquatic organisms, when sprayed because they pass on into the surface water.

33. (*i*) It is because fertiliser increases the crop production by supplying minerals in large amounts.

There is a decrease in production once their amount decreases in the soil after absorption by plants, reaching to lower layer of soil and killing the decomposer micro-organisms.

(*ii*) Manure decomposes slowly so production increases slowly due to slow release of minerals. They increases water holding and aeration capacity of the soil and do not kill decomposer microorganisms.

(*iii*) Manure is more beneficial for crops on a long term basis, fertilisers have short term advantages, but has long term disadvantages.

34.

	Manure		Fertiliser
(*i*)	They are organic compounds which contain nutrients in small amounts.	(*i*)	They are inorganic compounds which contain large amount of nutrients.
(*ii*)	They help in recycling of waste materials prepared in fabric itself	(*ii*)	They are expensive, prepared in industries.
(*iii*)	They increase the fertility of the soil	(*iii*)	They improve the fertility but only for a short duration.
(*iv*)	They are eco-friendly.	(*iv*)	They create environmental problems. When used in excess.
(*v*)	Continuous use is not harmful	(*v*)	Continuous use is harmful.
(*vi*)	They do not kill the micro-organisms, which increases and maintains the fertility of the soil.	(*vi*)	They kill micro-organisms.

35. Advantages of inter-cropping are:

(*i*) Prevents pests and decreases the chances of spoiling of whole of the crops, therefore reduce losses and both crops can give better results.

(*ii*) It can also deal with less monsoon or drought because crop which needs less water can easily survive.

Advantages of crop-rotation:

(*i*) Farmers can grow two or three crops in a year.

(*ii*) Pulses take nitrogen directly from the atmosphere, and thus need less amount of fertilisers.

(*iii*) Vegetables and fruits can be easily grown.

(*iv*) It makes best use of land and nutrients present in the soil.

36. (*i*) Degradation of quality. (*ii*) Loss in weight

(*iii*) Poor germinability (*iv*) Discolouration of the product

(*v*) Poor marketability

37. (*i*) Macronutrients are required in large amounts.

Micronutrients are required in small amount.

Macro-nutrients helps in the formation of carbohydrates, proteins and also give strength to plants.

Micronutrients increases resistance to diseases and have more adaptability.

(*ii*) N, P, K, Ca, S, Mg are macronutrients.

B, Fe, Mn, Zn, Cu, Mo, Cl are micro-nutrients.

(*iii*) Deficiency of these nutrients affects the physiological processes in plants including reproduction, growth and susceptibility to diseases.

38. (*i*) Viruses (*ii*) Bacteria (*iii*) Fungi

39. Kinds of irrigation systems adopted to supply water depends on the kinds of water resources available. These include wells, canals, rivers and tanks.

(*i*) **Wells:** There are two types of wells, namely dug wells and tube wells. In a dug well, water is collected from water bearing strata. Tube wells can tap water from the deeper strata. From these wells, water is lifted by pumps for irrigation.

(*ii*) **Canals:** This is usually an elaborate and extensive irrigation system. In this system canals receive water from one or more reservoirs or from rivers. The main canal is divided into branch canals having further distributaries to irrigate fields.

(*iii*) **River Lift Systems:** In areas where canal flow is insufficient or irregular due to inadequate reservoir release, the lift system is more rational. Water is directly drawn from the rivers for supplementing irrigation in areas close to rivers.

(*iv*) **Tanks:** These are small storage reservoirs, which intercept and store the run-off of smaller catchment areas. Fresh initiatives for increasing the water available for agriculture include rainwater harvesting and watershed management. This involves building small check-dams which lead to an increase in ground water levels. The check-dams stop the rainwater from flowing away and also reduce soil erosion.

40. *In favour:*

(*i*) Fertilizers supply nitrogen, phosphorus and potassium. Deficiency of these nutrients affects physiological processes in plants including reproduction, growth and susceptibility to diseases.

(*ii*) To increase the yield, the soil can be enriched by supplying these nutrients

(*iii*) Weeds, insects and diseases can be controlled by the use of pesticides, which include herbicides, insecticides and fungicides otherwise all money and efforts of the farmer goes waste.

Against:

(*i*) Continuous use of fertilizers in an area can destroy soil fertility excess fertilizer then leads to water pollution.

(*ii*) Excessive use of these chemicals creates problems, since they can be poisonous to many plant and animal species and cause environmental pollution.

(*iii*) Fertilizers and other chemicals have high-costs.

Organic farming is a solution to the problem. Manures are made from farm wastes. Integrated farm management is the modern way of reduce the use of chemicals, use bio fertilizers, use biological controls to manage the numbers of weeds, pests and pathogen in check while not compromising at the soil fertility and quality.

Weed control methods also include mechanical removal. Preventive methods such as proper seed bed preparation, timely sowing of crops, intercropping and crop rotation also help in weed control. Some other preventive measures against pests are the use of resistant varieties, and summer ploughing, in which fields are ploughed deep in summers to destroy weeds and pests.

3. Animal Husbandary

Animal husbandary is the branch of science that deals with studies of breeding, rearing, caring, and utilising the farm animals and dairy products. It is the scientific management of livestock. Milk, egg, meat are dairy products.

Live stock: It refers to the domestic animals which are kept and reared for milk, ride, meat, e.g. animals like horse, cow, buffalo, ox, pigs, goats, sheep, elephants, camels, hens, fishes, etc.

White Revolution: It is a programme which was started in India by Mr. V. Kurien to increase the production of milk.

Cattle Farming

Cattle farming is done for milk production and for agricultural work. Two species of cattle farming are:

Milch animals: These are milk producing animals like cows, buffaloes, goats, camels, reindeer.

Lactation Period is a period in which cows and buffaloes give milk after the birth of their calf. Milk production can be increased by increasing the lactation period.

Draught animals are used for farm labour, e.g. camel, bullocks, horse, elephants, ox etc.

Indigenous (Indian) Breeds of Cow

Red Sindhi are medium sized cows with red colour.
Sahiwal is a large sized and heavier build cow. It shows excellent resistant to diseases.
Gir are medium sized cows with good milk yield.
Exotic (Foreign) Breeds of cows:
These are used for cross breeding in India to get desired quality of cows, e.g. Jersy (Brown Swiss).
Improved breed of cows: Karan Swiss, Karan Fries, Frieswal are improved breed of cows developed by NDRI, Karnal by cross breeding. They yeild two to three times more milk than our indigenous cows.

Indigenous milch breed of cattle

Conditions Needed for Proper Breeding

- Proper cleaning and shelter facilities with well ventilated roofsheds.
- Regular brushing to remove dirt and loose hair.
- The floor of cattle shed should be made of concrete and have some slope, so as stay dry and facilitate cleaning.

Food Requirements of Dairy Animals

- Food required to support animal to live a healthy life.
- Milk producing requirements during lactation period.

Animal feed should include (*i*) Roughage (fibre), (*ii*) Concentrates (low in fibre) and high in proteins and other nutrients.

- Cattle need balanced feed containing all the nutrients in proper amount.
- Cattle feed should also contain micronutrients which promotes the health and milk output of dairy animals.

Cattle Diseases

- Cattle suffer from many diseases which reduces the milk production or may cause death.
- **External parasites** causes skin diseases. **Internal parasites** like worm affects the internal organ fluke damages liver.
- Bacteria and virus cause **infectious** diseases.
- Vaccination of farm animals is done against major viral and bacterial diseases.

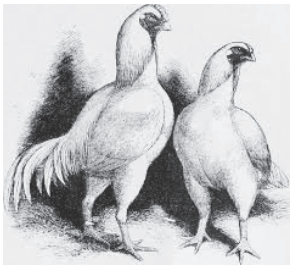
Poultry Farming

Poultry farming is raising of domestic fowl for egg production and meat.

- Improved poultry breeds are developed and farmed to produce layers for eggs and broilers for meat.
- Cross-breeding between **Indian (Aseel) and foreign (exotic Leghorn)** breeds results in new varieties with the following desirable traits:
  (*i*) Number and quality of chicks,
  (*ii*) Dwarf broiler parent for commercial chick production
  (*iii*) Summer adaptation capacity/tolerance to high temperature,
  (*iv*) Low maintenance requirements,
  (*v*) Reduction in size of the egg laying bird with the ability to utilise more fibrous, cheaper diets formulated using agricultural by-products.

Egg and Broiler Production

- Broiler chickens are fed with vitamin rich supplement feed for good growth rate and better feed efficiency. They need protein rich diet with adequate fat.
- Care needs to be taken to avoid mortality and to maintain feather and carcass quality.



Aseel

Leghorn

Good Management Practices

Maintenance of temperature and hygienic conditions in house and poultry feed.

- Prevention and control of diseases and pests.
- The level of vitamin A and K is kept high in poultry feeds.

Diseases

These are caused by virus, bacteria, fungi, parasites as well as by nutritional deficiencies.

- Virus cause fowl pox: Bacteria causes T.B., Cholera, diarrhoea; fungi causes aspergillosis, parasites, worms, mites, lice etc. also cause many diseases.
- Vaccination can prevent infectious diseases and reduce loss of poultry during outbreak of diseases.
- Proper cleaning, sanitation and spraying of disinfectants at regular intervals.

Fish Production

Fish production is the cheapest and best source of animal protein.

Types of Fish Production

Finned production (True fish production)**:** It is the production of finned true fish which are cartilagineous and bony such as pomphret, tuna, cod, catla, rohu.

Unfinned Production: It is the production of shell fish such as prawns and molluscs.

Ways of Obtaining Fish

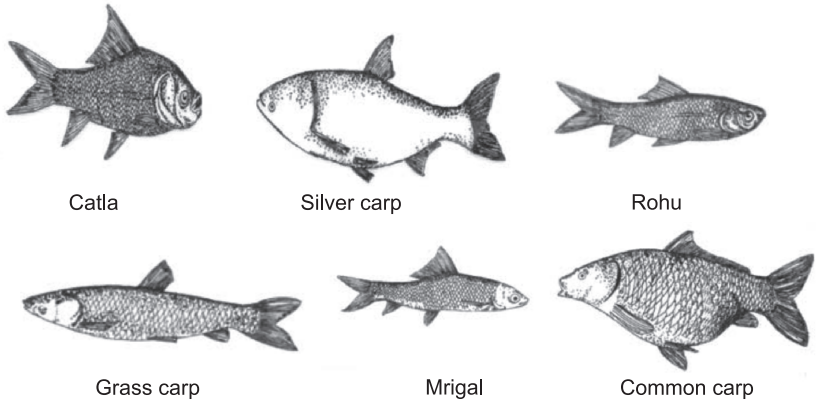
Capture fishing: It is a method of catching fishes from various water bodies in natural environment.

Culture fishing: Fishes of desired variety are cultivated in a confined area with a special care to get maximum yield. This is also called **aqua-culture**.

- It can be done in oceans, rivers, lakes, ponds etc.

Marine Fishing: It includes fish production in ponds, oceans, lakes etc.

- Popular marine fishes include pomphret, tuna, sardine, Bombay duck.
- Some costly fishes found in sea are mullets, bhetki, pearl spots.
- Apart from fish there are prawns, sea-weeds and oysters, which are cultivated for the pearls that they make.
- Satellites are also used to find the region of high fish population by echo sounds.



Mariculture: It is the culture fish production in water bodies like oceans.

Inland fishing: It includes fish production in fresh water like ponds, river, lakes and brackish water (estuaries) and lagoons. The water body where sea water meets fresh river water is called brackish water.

Mixed fish culture is done in combination of rice crops which needs lot of water to grow and fishes can also be grown in the water of the paddy field.

Composite fish culture uses both local and imported fish species.

- 5 to 6 variety of fishes are used in a single pond.
- Nutritional requirements of different types of variety are different so they are selected in such a manner that they do not compete for food as they have different food habits.
- Catla are surface feeders, Rohu feeds in middle zone of pond whereas mrigal and common carps are the bottom feeders and grass carps feed on weeds.
- All of them use their own food at own place without competing, which increases the fish yield from the same pond.

Problems of composite fish culture are:

(*i*) Many fishes breed only in monsoon.

(*ii*) Lack of availability of good quality seed (fertilized fish eggs).

Hormonal stimulation is done to increase their breeding and production to ensure supply of pure fish seed in desired quality.

Bee–Keeping

Honey is widely used as it is an instant source of energy and has medicinal properties. Wax is used in cosmetics, medicines, candle making and making of boot polish.

- It needs low investments good returns with more yield of honey and wax along with other agricultural practices like pollination of flower. It increase yield of crop.
- The setting up of a number of beehives in desirable location in a systematic manner that allows maximum pollen and nectar collection is called **Apiary**.
- Some common Indian variety are *Apis cerana indica* (Indian bee), *A. dorsatta* (rock bee), *A. florae* (little bee).
- One Italian variety *A. mellifer* is used in India for:
  (*a*) High honey collection capacity,
  (*b*) Fast reproduction,
  (*c*) Less Sting,
  (*d*) They stay in beehive for a long time.

- **Honey** is a dense sweet liquid rich in fructose. It is used in medicines, as a sugar substitute and as an instant source of energy.

Pasturage

Pasturage is the availability of flowers to bees for nectar and pollen collection.

- It affects the quality and quantity of honey because different flora produces nectar and pollen of different types, e.g. almond honey of Kashmir is very tasty.

Exercise 15.3

I. Very Short Answer Type Questions (1 Mark)

1. What is artificial insemination.?
2. Leghorn is a variety of which cattle/bird/fish?
3. What is pisciculture?
4. Name one India bee.
5. Name the two fresh water fishes?
6. What are weedicides or herbicides?
7. Which type of fishes feed on weeds?
8. Name the revolution which has led to better and more efficient use as well as availability of milk.
9. Why are oysters cultivated?

II. Short Answer Type Questions–I (2 Marks)

10. Discuss the implications of the following statement:
"It is interesting to note that poultry is India's most efficient converter of low fibre food stuff (which is unfit for human consumption) into highly nutritious animal protein food."
11. What management practices are common in dairy and poultry farming? **[***NCERT***]**
12. What are the differences between broilers and layers and in their management? **[***NCERT***]**
13. What are the desirable characters of bee varieties suitable for honey production? **[***NCERT***]**
14. For increasing production, what is common in poultry, fisheries and bee-keeping? **[***NCERT***]**
15. Match the column A with the column B **[HOTS]**

(A)	(B)
(*a*) Cattle used for tilling and carting	(*i*) Milk producing female
(*b*) Indian breed of chicken	(*ii*) Broiler
(*c*) Sahiwal, Red Sindhi	(*iii*) Draught animals
(*d*) Milch breed	(*iv*) Local breed of cattle
(e) Chicken better fed for obtaining meat	(*v*) Aseel

[*NCERT Exemplar*]

16. Match the column A with the column B

(A)	(B)
(*a*) Catla	(*i*) Bottom feeders
(*b*) Rohu	(*ii*) Surface feeders
(*c*) Mrigal	(*iii*) Middle-zone feeders
(*d*) Fish farming	(*iv*) Culture fishery

[*NCERT Exemplar*]

17. What is apiculture? What are the products obtained?
18. Name the four marine fish variety.
19. What would happen if poultry birds are larger in size and have no summer adaptation capacity? In order to get small sized poultry birds, having summer adaptability, what method will be employed? [*NCERT Exemplar*] **[HOTS]**
20. Name marine fishes of high economical value?
21. Which method is commonly used for improving cattle breeds and why? [*NCERT*]
22. Explain the following terms:
    (*a*) Fisheries (*b*) Aquaculture
    (*c*) Mariculture (*d*) Pisci culture
23. Why livestock production also needs to be improved?
24. Discuss the varieties of Indian cattle and their categories as per utility for farmers.
25. How will you know if an animal is healthy or sick?
26. How is mariculture practiced?

III. Short Answer Type Questions–II (3 Marks)

27. What is advantage of composite fish culture?
28. What is pasturage and how is it related to honey production? **[***NCERT***]**
29. How do good animal husbandry practices benefit farmers? **[***NCERT***]**
30. What are the benefits of cattle farming? **[***NCERT***]**
31. How are the fish caught from different source?
32. How do you differentiate between capture fishing, mariculture and aquaculture? **[***NCERT***]**
33. How are Parthenium plant significant in agriculture? Are they useful to a farmer? How does farmer deal with their presence in the farm?
34. What factors may be responsible for losses of grains during storage? Why should preventive measures and biological control methods be preferred for protecting crops?
35. If you are an animal expert and a group of farmers ask your advice as how can milk production be increased in Indian livestock, how will you guide them?
36. If you want to start your own poultry farm, what are the points to be kept in mind. Discuss any three.

IV. Long Answer Type Questions (5 Marks)

37. Give the merits and demerits of fish culture? [*NCERT Exemplar*]
38. Looking at the grim scenario of increasing population and food crisis, in your opinion how we should manage our agriculture–both in plant cultivation and animal husbandry to produce good quality and enough quantity of food. Describe any three ways.

Answers 15.3

1. The semen of desired bull is injected into the reproductive tract of cow during fertility period to get the desired characteristics.
2. It is an exotic variety of poultry.
3. The rearing and breeding of fishes by artificial means is called pisciculture.
4. *Apis Cerana indica*
5. Catla and Rohu
6. The chemicals which are used to destroy weeds (unwanted plants), e.g. 2, 4-Dichlor phenoxy acetic acid, Atrazine etc.
7. Grass carps

8. White revolution
9. They are cultivated for meat as well as for pearls that they make.
10. Poultry birds are able to get desired nutrients from low fibre food stuff which is rich in protein is needed by them.
    In return, they give eggs and high quality meat which is a rich source of proteins.
11. (*i*) Maintenance of proper temperature
    (*ii*) Clean housing facilities.
    (*iii*) Hygienic conditions
    (*iv*) Proper and balanced feed
    (*v*) Prevention and control of disease by vaccination.
12.

Broilers	Layers
(*i*) They are maintained for getting meat.	(*i*) They are needed for eggs.
(*ii*) They are raised upto 6-7 weeks	(*ii*) They start laying egg after 20 weeks.
(*iii*) They need less space and in this conditions they grow fast and have low mortality.	(*iii*) They need enough space, suitable temperature and high mortality.
(*iv*) They need food rich in proteins, adequate fat along with vitamin A and K.	(iv) They need restricted food with vitamins, minerals and micro-nutrients.

13. (*i*) They sting less.
    (*ii*) They stay in hives for longer periods.
    (*iii*) They reproduce faster.
    (*iv*) They produce comparatively more honey and wax.
14. (*i*) Through cross breeding the production of poultry, fisheries and bee keeping can be increased.
    (*ii*) Variety improvement, housing, rearing, sanitation, disease control are needed in all three of them.
15. (*i*) Draught animal (*ii*) Aseel
    (*iii*) Local breed of cattle (*iv*) Milk producing female
    (*v*) Brolier
16. (*i*) Surface feeder (*ii*) Middle zone feeder
    (*iii*) Bottom feeder (*iv*) Culture fishery
17. Bee–keeping is called apiculture. Honey and bees wax are the products.
18. Pomfret, Mackerel, Tuna, Sardines
19. Large sized birds need more feed and little summer adaptation leads to less egg laying.
    In order to get small sized poultry birds having summer adaptability we need to
    Cross breed between exotic and Indian breed, use exotic breeds, small size birds need less feed, high egg yielding capacity, lower requirement for space.
20. Mullets, bhetki, pear spots, shell fish such as prawns, mussels, oysters, sea weeds.
21. Milk production can be increased by selective breeding or cross breeding between a local breed like Red *Sindhi* or *Sahiwal* cow with an exotic bull breed which is selected for the characteristics of long lactation period and high milk yield.
    It can be done by natural methods or by artificial insemination.
22. (*a*) **Fisheries:** The occupation or industry of catching, processing, or selling fish or shellfish.
    (*b*) **Aquaculture:** The cultivation of aquatic animals and plants, especially fish, shellfish, and seaweed, in natural or controlled marine or fresh water environments; underwater agriculture.

(*c*) **Mariculture:** The cultivation of marine organisms in their natural environment

(*d*) **Pisciculture:** The breeding, hatching, and rearing of fish under controlled conditions.

23. As the population increases and as living standards increase, the demand for milk, eggs and meat is also going up. Also, the growing awareness of the need for humane treatment of livestock has brought in new limitations in livestock farming. Thus, livestock production also needs to be improved.

24. Indian cattle belong to two different species: Bosindicus, cows, and Bosbubalis, buffaloes. Milk-producing females are called milch animals (dairy animals), while the ones used for farm labour are called draught animals.

25. A healthy animal feeds regularly and has a normal posture. It will give a good production of egg/ meat/milk etc. Its coat will shine and it will be physically active.

26. Marine fish are caught using many kinds of fishing nets from fishing boats. Yields are increased by locating large schools of fish in the open sea using satellites and echo-sounders. Some marine fish of high economic value are also farmed in seawater.

27. (*i*) The species present in a composite fish culture can use all the food available in different zones.

(*ii*) They do not compete with each other.

(*iii*) An increased fish yield from the pond is obtained.

(*iv*) They feed on aquatic species, therefore their cost of production is less.

28. Pasturage is the availability of flowers for nectar and pollen collection for honeybee. The kind and quality of honey is determined by the kind and quality of pasturage.

29. (*i*) It improves the breed of domestic animals.

(*ii*) It increases production of milk, meat, eggs etc.

(*iii*) It helps in proper management of domestic animals in terms of shelter, feeding care and protection against diseases.

30. (*i*) Milk production is increased by special animal breed obtained through cross breeding.

(*ii*) Good quality of meat can be obtained.

(*iii*) Good breed of draught animals can be produced.

(*iv*) The plant materials/crops-wastes/ weeds/fodder crops from the field can be used.

(*v*) Excreta of animals can be changed into bio-gas and manure.

31. (*i*) **Capture fishing:** In this, fishes are obtained from natural sources like lakes, rivers, ponds, oceans, brackish water.

(*ii*) **Fish farming** (culture farming) is culturing, feeding, breeding and fish production. It is based on aquaculture. Production of aquatic plants and animals such as fishes, prawn, cray fish, lobsters, crabs, shrimps, mussels, sea insects, oysters etc. is done.

32.

Capture fishing	Mariculture	Aqua culture
Fish catching is done from natural sources like lakes, rivers, oceans, seas etc.	Culture of marine fishes is done in the coastal water.	Culture of fish is done by using water bodies which may be present in salty water or fresh water.

33. It is a weed. They are harmful to the crop as they compete for food, space and light. They take up nutrients and reduce the growth of the crop.
Therefore, removal of weeds from cultivated fields during the early stages of crop growth is essential for a good harvest.

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

weight, poor germinability, discolouration of produce, all leading to poor marketability. These factors can be controlled by proper treatment and by systematic management of warehouses. Preventive and control measures are used before grains are stored for future use. They include strict cleaning of the produce before storage, proper drying of the produce first in sunlight and then in shade, and fumigation using chemicals that can kill pests.

35. Milk production can be increased by increasing the lactation period. 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.

The food requirements of dairy animals are of two types:

(*a*) maintenance requirement, which is the food required to support the animal to live a healthy life.

(*b*) milk producing requirement, which is the type of food required during the lactation period.

Animal feed includes:

(*a*) roughage, which is largely fibre.

(*b*) concentrates, which are low in fibre and contain relatively high levels of proteins and other nutrients. Cattle need balanced rations containing all nutrients in proportionate amounts. Besides such nutritious food material, certain feed additives containing micronutrients promote the health and milk output of dairy animals.

36. The ration (daily food requirement) for broilers is protein rich with adequate fat. The level of vitamins A and K is kept high in the poultry feeds.

Poultry fowl suffer from a number of diseases caused by virus, bacteria, fungi, parasites, as well as from nutritional deficiencies. These necessitate proper cleaning, sanitation, and spraying of disinfectants at regular intervals.

Appropriate vaccination can prevent the occurrence of infectious diseases and reduce loss of poultry during an outbreak of disease.

37. **Merits**

(*i*) We get economically desired fishes.

(*ii*) Fishes are made to breed in different seasons by hormonal stimulation.

(*iii*) There is less mortality.

(*iv*) Though hybridisation or cross breeding high yield and quality of fishes can be obtained.

(*v*) A large number of fishes can be raised in a small area.

Demerits:

(*i*) It give rise to monoculture.

(*ii*) Biodiversity may be threatened by it.

(*iii*) Some varities of fishes may get extinct.

38. (*i*) Organic farming is a farming system with minimal or no use of chemicals as fertilizers, herbicides, pesticides etc. and with a maximum input of organic manures, recycled farm wastes, and bio-agents, with healthy cropping systems. Mixed farming is a system of farming on a particular farm which includes crop production, raising of livestock etc.

(*ii*) Techniques like Mixed cropping, inter-cropping. , crop rotation should be practiced

(*iii*) Varietal improvement is required for higher yield, good quality, biotic and abiotic resistance, shortening the maturity duration, wider adaptability and desirable agronomic characteristics.

(*iv*) Farm animals require proper care and management such as shelter, feeding, breeding and disease control. Cross breeding is done between Indian and exotic breeds for variety improvement. To increase production of fish, they can be cultured in marine and inland ecosystems. (*Any three*)

Value Based Questions

1. Due to excessive use of chemicals Raghuveer noticed that the productivity of his field has somewhat decreased. He discussed this with his son Gopal. Gopal obtained the information from Kisan channel and asked his father to go for intercropping and crop rotation. They used farm waste as manure instead of fertilisers and had a good yield.

(*i*) Gopal suggested a farming practice with no or minimal use of chemicals. What is its called?

(*ii*) How can the recycling of organic wastes being done in the field?

(*iii*) Which values of Gopal assisted him in facing the situation? [*CBSE* 2016]

2. Ram Singh uses excess of fertilisers and pesticides in his field whereas Sham Singh uses manure, biofertilisers and organic pest control methods. Mr. Rajesh told Ram Singh that excessive use of fertilisers are harmful for the soil.

(*i*) What are the three major nutrients needed for the plants to grow?

(*ii*) What is a the disadvantage of continuous use of fertilisers?

(*iii*) What values are associated with Mr. Rajesh and Sham Singh?

Answers

1. (*i*) Organic farming

(*ii*) By composting of organic wastes

(*iii*) Scientific temper, application of knowledge, Awareness about new technologies

2. (*i*) Nitrogen, Phosphorus and Potassium

(*ii*) Continuous use of fertilisers will destroy the soil fertility as organic matter is not regenerated and microorganisms are harmed.

(*iii*) Mr. Rajesh and Sham Singh have scientific knowledge and know the advantage of manure over biofertilisers and chemical fertilisers and they are very much concerned about the environment.

COMMON ERRORS

Errors	Corrections
• Students do not learn names of Indian and exotic breeds of cattles.	☞ Learn names with correct spelling by writing.
• Students do not remember types of fishes.	☞ Learn four examples of each type.
• Students do not write correct definitions.	☞ Do practice of writing definitions twice or thrice.
• Students leave certain part of chapter.	☞ Do not leave any part of chapter as it may come in exam.
• Students do not classify crops properly.	☞ Learn various types of crops.

REVISION CHART