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Crop Production and Management

TOPICS COVERED

1.1 Crops and Cropping Patterns

1.2 Basic Practices in Crop Production

1.3 Animal Husbandry

IMPORTANT POINTS TO REMEMBER

- **Agriculture** is the practice of growing plants and rearing animals on a large scale for food and other useful products.
- Cultivation of crops involves several techniques and activities that farmer has to undertake. These are collectively termed as **agricultural practices**.
- Agricultural practices include preparation of soil, sowing seeds, replenishing soil with nutrients, irrigating the field, protection from pests and weeds, harvesting, threshing, and winnowing and storage of the produce.
- Preparation of soil involves turning and loosening of soil and then levelling it. Turning and loosening of soil is called **ploughing/tilling**. It has several advantages
 - (a) Loose soil allows roots to breathe easily.
 - (b) It helps the root to penetrate deeper.
 - (c) It promotes the growth of earthworms and other microbes that further aid in this process.
 - (d) It brings nutrient rich soil on the top so that minerals can be used efficiently by the plants.Ploughs and levelers are used for this purpose.
- **Sowing** of seeds at appropriate depth and distance gives a good yield. Good variety and healthy seeds should be selected for sowing. Sowing can be done manually or by using a seed drill.
- In case the seeds of a particular crop are not viable, the technique of **transplantation** is used wherein healthy seedlings from the nursery are transferred to the main field, eg, paddy, chillies, some flowering plants etc.
- To get a good yield, soil needs replenishment and enrichment through the use of organic **manures** and **fertilisers**.
- Natural methods of soil replenishment include **field fallow**, **crop rotation** and **mixed cropping techniques**.
- Supply of water to crops at appropriate intervals is called **irrigation**.
- **Weeding** involves removal of unwanted and uncultivated plants called weeds either manually, mechanically or by using chemicals called weedicides.
- **Harvesting** is the process of cutting of the mature crops manually or by machines.
- Separation of grains from the harvested crop is called **threshing**.
- Removing chaff from grains using wind is called **winnowing**.

- Proper storage of grains is necessary to protect them from pests and microorganisms.
- Crop production can be increased by increasing the land under cultivation, by improvement in methods of agriculture or by developing better varieties of crops.
- Rearing and management of domesticated animals so as to get useful products from them is called **animal husbandry**.

1.1 CROPS AND CROPPING PATTERNS

Crop: Same kind of plants grown and tended at a place on a large scale constitute a **crop**. For example, crop of wheat means that all the plants grown in a field are that of wheat. Crops are of different types like cereals, vegetables and fruits.

Cropping Patterns: In India, broadly speaking two cropping patterns/ seasons crops are identified. These are **Kharif** crops and **Rabi** crops.

Kharif crops require lot of water, they are sown at the beginning of monsoon season (June/July) and harvested in September or October. E.g. paddy, maize, soyabean etc.

Rabi crops do not require much water, are sown at the beginning of winter season (October to December) and harvested by March/April. E.g. wheat, gram, pea, mustard etc.

Exercise 1.1

I. Very Short Answer Type Questions (1 Mark)

1. What are crops?
2. Name two cropping seasons.
3. Give one example each of Kharif crop and Rabi crop.
4. Define agriculture.

II. Short Answer Type Questions (2/3 Marks)

5. What would happen if wheat is sown in Kharif season?
6. State two differences between Kharif and Rabi crops.

ANSWERS

1. Same kind of plants grown and tended at a place on a large scale constitute a **crop**.
2. The two cropping seasons are **Kharif** crops and **Rabi** crops.
3. **Kharif** crops *e.g.* paddy, maize, soyabean (*Any one*)
Rabi crops *e.g.* wheat, gram, pea, mustard (*Any one*)
4. **Agriculture** is the practice of growing plants and rearing animals on a large scale for food and other useful products.
5. Wheat is a rabi crop, hence does not require much water to grow. If it is sown in Kharif season, its seeds would be damaged due to exposure to excessive amount of water than required.

6.	Kharif	Rabi
	Crops require lot of water	Crops do not require much water
	They are sown at the beginning of monsoon season (June/July).	Sown at the beginning of winter season (October to December)
	Harvested in September or October	Harvested in March/April
	E.g. Paddy, maize, soyabean etc.	E.g. Wheat, gram, pea, mustard etc.

1.2 BASIC PRACTICES IN CROP PRODUCTION

The step by step method of agriculture is:

Preparation of soil → Seed selection and Sowing → Adding Manures and Fertilisers → Irrigation → Weeding → Harvesting, Threshing and Winnowing → Storage

Preparation of Soil

Ploughing is carried out by using a wooden or an iron plough that is pulled either by animals or by tractors. Tilled soil may have big lumps of soil (crumbs) which need to be crushed with a plank. The soil is leveled for sowing as well as irrigation purposes by levellers. Levelling also prevents soil erosion.

Agricultural Implements

Plough contains a strong triangular iron strip called ploughshare which is attached to a long log of wood called ploughshaft. The other end of plough is attached to a beam placed on bulls' necks.

Hoe is a simple tool that has a long rod of wood or iron. A strong, broad and bent plate of iron is fixed to one of its end and it works like a blade. It is pulled by animals.

Cultivator is a tractor driven implement used for ploughing. It saves time and labour.

Sowing: To separate good quality seeds from poor ones, put the seeds in a beaker half filled with water. We observe that some seeds float while the other sinks. The ones that float are not fit for sowing as they are hollow while the ones that sink are suitable for sowing.

Seeds can be sown either manually or by using seed drills. Using a seed drill has many advantages:

- (a) It sows seeds uniformly at proper distances and depth.
- (b) It ensures that seeds get covered with soil after sowing. This prevents damage caused by birds.
- (c) Sowing by seed drill saves time and labour.

Sowing seeds at appropriate distance prevents overcrowding of plants. It also allows plants to get sufficient sunlight, nutrients and water.

Adding Manures and Fertilisers: Manures are organic substances obtained from dead plants and animals. For *e.g.* green manure, compost, vermicompost etc.

	Steps	Implements
1.	Soil preparation: (a) Ploughing (b) Levelling	Wooden or iron ploughs, Hoe, Cultivator Wooden or iron levellers
2.	Sowing	Hand sowing (broadcasting), Seed drills
3.	Manuring	Manually or with drills
4.	Irrigation	Tubewells, Sprinklers
5.	Weeding	Trowel, drills
6.	Crop protection	Sprayers
7.	Harvesting	Sickle, Harvesters, Combine
8.	Threshing	Animals, Threshers, Combine
9.	Storage	Jute bags, Silos, Granaries

Common Implements used in Agriculture

Fertilisers are man-made chemical substances that contain one or more nutrients essential for plant growth. For e.g. NPK , urea, potash, super phosphate etc.

Advantages of using manure over fertilisers:

- (a) It restores the soil texture.
- (b) It improves water holding capacity of the soil.
- (c) It makes soil porous and aerated.
- (d) It increases the number of friendly microbes.
- (e) It adds humus to the soil that improves physical and chemical properties of the soil.

Differences between manure and fertiliser.

	Manure	Fertilizer
1.	They are natural organic substances.	They are inorganic salts made by humans.
2.	They are rich in humus but not in inorganic nutrients.	They are rich in inorganic nutrients but not in humus.
3.	They are prepared in fields.	They are prepared in factories.
4.	They are not readily soluble in water, thus they are absorbed slowly by the plants.	They are soluble in water and are readily absorbed by the plants.
5.	They do not cause pollution.	They cause water pollution.

Natural Methods of Soil Replenishment

- *Field fallow* means to leave the land free or fallow for one or more season.
- *Crop rotation* means to grow different crops alternately on the same piece of land. For e.g. wheat uses a lot of nitrogen from the soil. This nitrogen can be naturally replenished if the next crop grown is a legume like groundnut or pea. Bacteria called Rhizobium present in the root nodules of leguminous plants fix atmospheric nitrogen to form water soluble nitrogen compounds that can be used by the next crop.
- *Mixed cropping*: Sometimes two or more crops with different nutritional needs are grown simultaneously on the same piece of land. For example, cotton and groundnut. This method of growing crops is called mixed cropping.

Irrigation: Our agriculture is mainly rain fed. But rainfall can be erratic so farmer depends on other sources like rivers, canals, wells, tubewells etc.

Purpose of Irrigation:

- (a) Irrigation provides water to the plants for various physiological activities like photosynthesis, transpiration etc.
- (b) Water helps in absorption of minerals from the soil.
- (c) Water is essential for the germination of seeds.
- (d) Water is needed for plant growth.
- (e) Water forms 90% of the plants' bulk.
- (f) Water protects crops from frost and from dry hot air currents.

Traditional methods of irrigation: These involve cattle or human labour, and hence are cheaper but less efficient methods. For eg. moat, dhekli, chain pump, rahat. Pumps are commonly used for lifting water. Diesel, biogas, solar energy and electricity are used for running these pumps.

Modern methods of irrigation: These methods help us conserve water.

- (a) *Sprinkler system:* This system is used on uneven land where less water is available. Perpendicular pipes having rotating nozzles on top are joined to the main pipeline at regular intervals. Water is allowed to flow through the main pipe under pressure, which escapes from the rotating nozzles. In this way water gets sprinkled on the crop like it is raining. This system is very useful for growing crops in sandy soil.
- (b) *Drip irrigation:* This system involves tubes and pipes that supply water to the roots of the plant drop by drop thus minimising wastage. It is a boon in regions where availability of water is very poor as no water is wasted at all in this method.

Weeding: Weeds are unwanted plants that grow along with the main crop. Removal of weeds is called weeding. Weeding is necessary as:

- (a) Weeds compete with crop plants for water, nutrients, space, sunlight etc and it thus affect its growth.
- (b) Weeds may be poisonous to humans, domestic animals etc
- (c) They even interfere with harvesting.

Weeding is done by the following ways:

- (a) *Manual methods:* Involve weed removal by pulling them with hand or by using a trowel, hoe or rake.
- (b) *Mechanical methods:* Tilling before sowing uproots weeds and kills them. A seed drill can also be used to uproot weeds.
- (c) *Chemical methods:* Involve the use of weedicides with a sprayer. For e.g. 2,4 – D, metachlor. They should be sprayed during the vegetative growth of weeds before flowering and seed formation. Since they are poisonous, a farmer should cover his mouth and nose with a cloth while spraying them.

Harvesting: Crop is cut using sickle or by a machine called harvester. Both harvesting and threshing can be done by a machine called combine. This is followed by winnowing.

Storage: Freshly harvested crops has lot of moisture. If freshly harvested grains are stored before drying, they may get spoilt due to attack by microorganisms, insects and pests and lose their germination capacity. Thus they should be properly dried in sun and then in shade before storage.

Farmers store grains in jute bags or metallic bins. Large scale storage of grains is done in silos and granaries. All storage structures must be thoroughly cleaned and fumigated before storage of grains. At homes, dried neem leaves can be kept along with grains to repel insects.

Exercise 1.2

I. Very Short Answer Type Questions (1 Mark)

1. Name a machine used for both harvesting and threshing.
 2. What is the term used for the metal containers used for storing grains on a large scale?
 3. Name the method of irrigation that makes use of dripping pipes to save water.
 4. Name the method of growing different crops on the same piece of land to replenish the plant nutrients.
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5. What name is given to the chemicals that are used to destroy weeds?
6. A farmer sows beans in his field after harvesting a crop of wheat. The agricultural practice he is following is _____.

II. Short Answer Type Questions–1 (2 Marks)

7. How can grains be stored at home?
8. In sequential order, list the basic practices in crop production.
9. What is transplantation? Name a few plants that can be transplanted.
10. What are the advantages of turning the soil before sowing seeds?
11. Why should harvested grains be dried before storage?

III. Short Answer Type Questions–2 (3 Marks)

12. Define the following terms – Ploughing, Irrigation, Weeding, Harvesting, Threshing and Winnowing
13. What are weeds? Why should they be removed?

IV. Long Answer Type Questions (5 Marks)

14. Differentiate between manures and fertilisers.
15. List the advantages of manures over fertilisers.
16. Briefly discuss any three methods of replenishing soil naturally.

ANSWERS

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| <ol style="list-style-type: none"> 1. Combine 2. Silos 3. Drip irrigation 4. Mixed cropping 5. Weedicides 6. Crop rotation 7. Grains can be stored in airtight steel or plastic containers with dried neem leaves that act as insect repellants. 8. The sequential order of the basic practices in crop production is:
Preparation of soil → Seed selection and sowing → Adding Manure and Fertilisers → Irrigation → Weeding → Harvesting, threshing and winnowing → Storage 9. Transplantation is a technique used wherein healthy seedlings from the nursery are transferred to the main field to replace the non-viable seeds of a crop. Paddy, chillies and some flowering plants can be transplanted. 10. Advantages of turning the soil (ploughing) before sowing are: <ol style="list-style-type: none"> (a) It loosens soil that allows the roots to breathe easily. (b) It helps roots to penetrate deeper in the soil. (c) It promotes the growth of earthworms and other microbes that further aid in loosening of soil. (d) It brings nutrient rich soil on the top so that minerals can be used efficiently by the plants. | <ol style="list-style-type: none"> 11. Fresh crops have lot of moisture. If freshly harvested grains are stored before drying, they may get spoilt by the attack the microorganisms, insect and pests and lose their germination capacity. Thus crops should be properly dried in sun and then in shade before storage. 12. Turning and loosening of soil is called ploughing/tilling.
Supply of water to crops at appropriate intervals is called irrigation.
Weeding involves removal of unwanted and uncultivated plants called weeds either manually, mechanically or by using chemicals called weedicides.
Harvesting is the process of cutting of the mature crops manually or by using machines.
Separation of grains from the harvested crops is called threshing.
Removing chaff from grains using wind is called winnowing. 13. Weeds are unwanted plants that grow along with the main crop. Weeds should be removed because: <ol style="list-style-type: none"> (a) Weeds compete with crop plants for water, nutrients, space, sunlight etc and thus affect its growth. |
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- (b) Weeds may be poisonous to humans, domestic animals etc.
- (c) They even interfere with harvesting process.
14. Differences between manures and fertilisers.

	Manure	Fertiliser
1.	They are natural organic substances.	They are inorganic salts made by humans.
2.	They are rich in humus but not in inorganic nutrients.	They are rich in inorganic nutrients but not in humus.
3.	They are prepared in fields.	They are prepared in factories.
4.	They are not readily soluble in water thus are absorbed slowly by the plants.	They are soluble in water and are readily absorbed by the plants.
5.	They do not cause pollution.	They cause water pollution.

15. Advantages of using manures over fertilisers are
- (a) It restores soil texture.
- (b) It improves water holding capacity of the soil.
- (c) It makes the soil porous and aerated.
- (d) It increases the number of friendly microbes.

- (e) It adds humus to the soil that improves physical and chemical properties of the soil.

16. Three natural methods of soil replenishment are:

- (a) **Field fallow:** It means to leave the land free or fallow for one or more season. In the lean period, when crop is not activated, soil can easily replenish the nutrients through various physical and biological processes.
- (b) **Crop rotation:** It means to grow different crops alternately on the same piece of land. For example, wheat uses a lot of nitrogen from the soil. This nitrogen can be naturally replenished if the next crop grown is a legume like groundnut or pea. Bacteria called Rhizobium present in the root nodules of leguminous plants fix the atmospheric nitrogen to form water soluble nitrogen compounds that can be used by the next crop.
- (c) **Mixed cropping:** It is a process of growing two or more crops with different nutritional needs simultaneously on the same piece of land. *For example:* cotton and groundnut. In this way there is no burden on a single particular nutrient of the soil, which helps in its replenishment.

1.3 ANIMAL HUSBANDRY

- Like plants, animals also provide us with different kinds of food. The breeding, feeding and caring for domestic animals for food and other purposes is called animal husbandry. Some examples of animals that provide us food are:
 - (a) Meat and egg yielding animals such as goat, chicken, fish, turkey etc.
 - (b) Milch animals like goat, cow, buffalo, camel etc.
 - (c) Honey bees for the production of honey is called apiculture.
- Animals that carry out farm labour are called draught animals. For example, bull, ox, horse etc.

Exercise 1.3

I. Very Short Answer Type Questions (1 Mark)

1. A milch animal is the one that yields _____.
2. Rearing honeybees for honey is called _____.

II. Short Answer Type Question (2 Marks)

3. What is animal husbandry?

ANSWERS

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| 1. milk | 2. apiculture | domestic animals for food and other purposes is called animal husbandry. |
| 3. The breeding, feeding and caring for | | |

Did You Know?

- Rearing of honey bees to obtain honey from them is called apiculture while rearing of silkworms to obtain silk from them is called sericulture.
- Horticulture is a branch of agriculture that deals with flowers and ornamental plants.
- Excessive use of fertilizers can lead to eutrophication.
- Green revolution was the phase in Indian agriculture when there was a great increase in food-grain production while white revolution refers to significant increase in availability of milk production.

HOTS & VALUE BASED QUESTIONS

1. What is the difference between composting and vermicomposting? **(HOTS)**
2. Name the technique used for growing paddy. What are the advantages of using this technique? **(HOTS)**
3. If there is low rainfall in an area, which technique can be adopted by the farmer for irrigation? **(HOTS)**
4. A farmer grows a cereal alternating with a legume so as to enrich the soil. With which nutrient does the soil get enriched? What values are being shown by the farmer? **(VBQ)**
5. To store grains on a large scale at home, my mother uses dried neem leaves, turmeric powder etc. Why is this practice better than using chemicals to protect the grains? Name any two values exhibited by her. **(VBQ)**
6. What is the harmful impact of burning dried leaves, stubs of plants etc. on environment? List any one way of dealing with them that does not affect the environment adversely? **(VBQ)**

ANSWERS

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| 1. Vermicomposting makes use of a special class of earthworms called redworms in addition to microbes to hasten the process of compost formation while composting only relies on the action of microbes for the same. | | 4. Nitrogen. Environment consciousness, scientific attitude etc. |
| 2. Transplantation. Only the healthy seedlings are shifted to the main field so the crop yield is good. | | 5. Since, they are natural products, they do not harm the grains. Environment consciousness, scientific attitude etc. |
| 3. Drip irrigation is the technique that can be adopted by the farmer for irrigation in case of scarcity of rainfall as it saves water. | | 6. Burning of dried leaves, stubs of plants etc releases harmful gases in the environment that not only pollute the atmosphere but also cause respiratory disorders. These can be placed in the composting pits and converted into compost. |
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