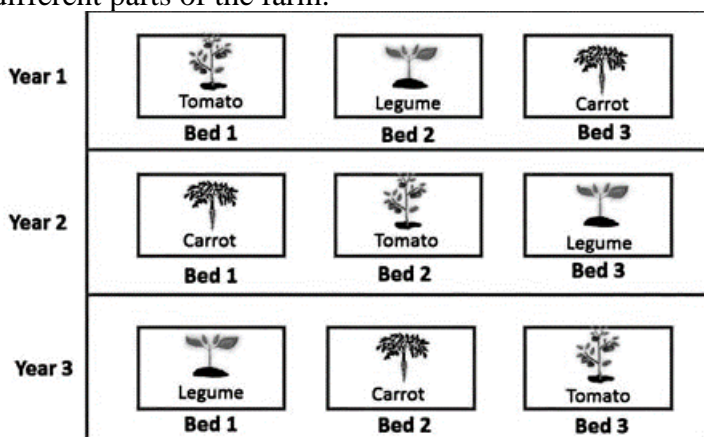




<b>CLASS: IX</b>	<b>DEPARTMENT: SCIENCE (2025-26)</b> <b>SUBJECT: BIOLOGY</b>	<b>DATE: 11/11/2025</b>
<b>WORKSHEET NO: 5</b> <b>WITH ANSWERS</b>	<b>TOPIC: IMPROVEMENT IN FOOD</b> <b>RESOURCES -PART 1</b>	<b>NOTE: A4 FILE</b> <b>FORMAT</b>
<b>CLASS &amp; SEC:</b>	<b>NAME OF THE STUDENT:</b>	<b>ROLL NO.</b>

### I. OBJECTIVE TYPE QUESTIONS

- The method of crossing two different plant varieties to combine desirable traits such as disease resistance and high yield is called:  
A. Tissue culture  
B. Hybridisation  
C. Pruning  
D. Weeding
- Leguminous crops help in restoring soil fertility because they:  
A. Needs less water  
B. Absorb nitrogen from air  
C. Fix atmospheric nitrogen in soil  
D. Require no fertiliser
- The diagram shows the crop harvesting pattern followed by a farmer. Bed 1, Bed 2 and Bed 3 are different parts of the farm.



What is the common term used for this pattern of crop harvesting?

- Crop rotation
  - Mixed cropping
  - Intercropping
  - Organic farming
- A soil sample has adequate water-holding capacity but is deficient in phosphorus and potassium. Which of these would improve the quality of crops grown in that field?  
A. Removing weeds

- B. Applying fertiliser
  - C. Modifying the irrigation system
  - D. Growing two different crosses at the same time.
5. Find out the wrong statement from the following.
    - A. The White Revolution is meant for an increase in milk production.
    - B. Blue revolution is meant for an increase in fish production.
    - C. Increasing food production without compromising environmental quality is called sustainable agriculture.
    - D. None of the above.
  6. To solve the food problem of the country, which of the following is necessary?
    - A. Increased production and storage of food grains
    - B. Easy access of people to food grains
    - C. People should have money to purchase the grains
    - D. All of the above
  7. Weed affects the crop plants by
    - A. Killing of 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
  8. Using fertilisers in farming is done for
    - A. No cost production
    - B. Low-cost production
    - C. High-cost production
    - D. None of these
  9. Manures are used in sandy soil mainly to
    - A. Provide all essential nutrients to crops
    - B. Increase the water holding capacity
    - C. Avoid waterlogging
    - D. Reduce soil pollution
  10. Crop varieties can be made disease-resistant by:
    - A. Genetic modification
    - B. Hybridisation
    - C. Green manure
    - D. Both A and B
  11. Identify the oilseed among the following:
    - A. Sugarcane
    - B. Rice
    - C. Sunflower
    - D. Green gram

**I. ASSERTION AND REASON:**

For the question numbers 12,13, and 14, two statements are given- one labelled Assertion (A) and the other labelled Reason (R). Select the correct answer to these questions from the codes (i), (ii), (iii) and (iv) as given below -

- i) **Both A and R are true, and R is the correct explanation of the assertion.**

- ii) **Both A and R are true, but R is not the correct explanation of the assertion.**
- iii) **A is true, but R is false.**
- iv) **A is false, but R is true**

12. **Assertion (A):** Nitrogen is a micronutrient.

**Reason (R):** Micronutrients are nutrients required in small quantities.

13. **Assertion (A):** Presence of weeds affects the crop field.

**Reason (R):** Weeds compete for food, space and light.

14. **Assertion (A):** Crop rotation is the practice of growing two or more varieties of crops in the same region in sequential seasons.

**Reason (R):** Cauliflower and chilli plants grown together in alternating rows are examples of crop rotation.

## **II. SHORT ANSWER TYPE TWO MARK QUESTIONS**

- 15. Define hybridisation and its types.
- 16. Enumerate two differences between mixed cropping and intercropping.
- 17. Give two advantages of using manure over fertiliser.
- 18. State any four factors for which crop variety improvement is done.
- 19. Define the term photoperiod. State its significance.
- 20. Briefly explain any two sources of irrigation.
- 21. What are the fresh initiatives in irrigation?
- 22. What are weeds? Give two examples of weeds.

## **III. SHORT ANSWER TYPE THREE MARK QUESTIONS**

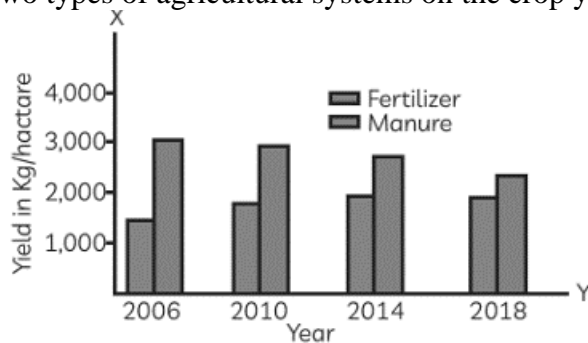
- 23. Mention the three different ways in which crop plants can be attacked by insect pests. Suggest one control measure and two preventive measures against pests.
- 24. A farmer wants to harvest more than two varieties of crops at a time from his field. Suggest to him one method to get the desired result. Also state two advantages of this cropping pattern.
- 25. a) Briefly describe the formation of vermi-compost and green manure.  
b) Give one advantage of using manure for nutrient management.
- 26. Define crop rotation. While choosing plants for crop rotation, what factors should be kept in mind?
- 27. How many nutrients are essential for plants? What are macronutrients and micronutrients?
- 28. a) Farmer 'X' planted soya bean + maize + cowpeas in the same field simultaneously in a set row pattern. Farmer 'Y' planted a cereal crop in one season and a leguminous crop in the next season on the same piece of land in preplanned succession. Name the cropping pattern used by farmers 'X' and 'Y'. b) State two advantages of the cropping pattern followed by farmers 'X' and 'Y'.

#### IV. CASE STUDY BASED QUESTIONS

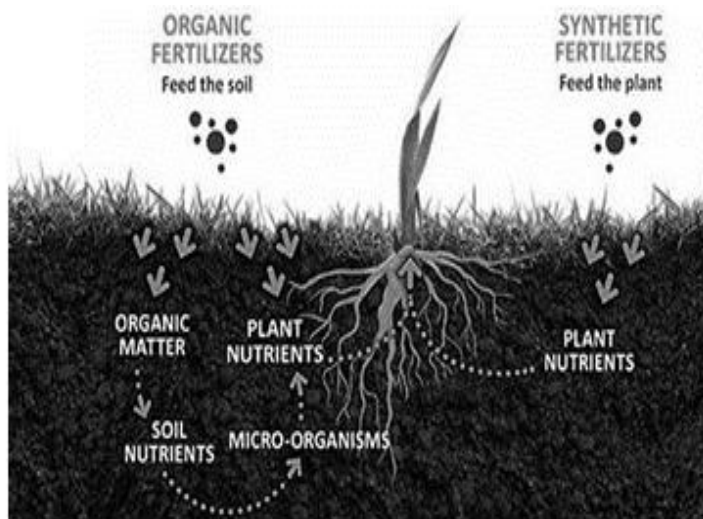
29. Farmers in the state of Punjab faced frequent attacks of fungal diseases in their wheat crops, leading to low yield and poor grain quality. Scientists at the Indian Agricultural Research Institute (IARI) developed a new variety of wheat called PBW-343, which had high yield, disease resistance, and a shorter maturity period. Later, with the advancement of genetic modification (GM) technology, new rice varieties were produced that could tolerate flooding and drought conditions and had higher protein content. Some farmers were hesitant to adopt GM seeds due to fear of high cost and dependency on companies, while others observed a remarkable increase in productivity and profit.

- What was the major problem faced by Punjab farmers in their wheat crops? Name the improved variety of wheat developed by IARI.
- What is crop variety improvement? Mention any two desirable traits achieved through it.
- How do genetically modified crops help in increasing food production?
- Differentiate between traditional hybridisation and genetic modification in plants.

30. Intensive farming is an agricultural system that aims to maximise yields from available land through various means, such as heavy use of pesticides and chemical fertilisers. On the other hand, organic farming is a farming system with minimal or no use of chemical fertilisers. Both the farming systems differ in the yield produced, inputs required and effect on soil characteristics like water holding capacity, soil microorganisms, aeration, etc. The graph given below shows the effect of organic manure and chemical fertilisers used in these two types of agricultural systems on the crop yield over a period.



- Describe the trends in crop yields between 2006 and 2018. (1)
- Explain the effect of adding manure on the water-holding capacity of: (i) Sandy soil (ii) Clay soil (2)
- The picture shows how organic manure and chemical fertilizer are used by plants. (1)  
Observe the picture carefully and write your observations



## V. LONG ANSWER TYPE QUESTIONS

31. a) Distinguish between
  - i) Macro Nutrients and Micronutrients
  - ii) Compost and Vermicompost.
  - iii) Manure and fertilisers.
 b) List two biotic and abiotic factors each that are responsible for grain loss.
32. i) Briefly explain the protection of stored grains.  
 ii) Differentiate between cereals and pulses as crops.
33. i) Why is organic farming considered a sustainable agricultural method?  
 ii) Of the various cropping patterns, why is crop rotation called a sustainable cropping pattern?
34. a) A farmer observed a Parthenium plant growing along with a wheat crop. What is Parthenium? What should he do to protect his crop? Why?  
 b) How does grain loss occur during storage? What preventive and control measures are used before grains are stored for future use?

## ANSWERS

<u>OBJECTIVE TYPE QUESTIONS</u>	
1.	B. Hybridisation
2.	C. Fix atmospheric nitrogen in soil
3.	A. Crop rotation
4.	B. Applying fertiliser
5.	D. None of the above
6.	D. All of the above
7.	C. Competing for various resources of crops (plants), causing low availability of nutrients
8.	B. Low-cost production
9.	B. Increase the water holding capacity
10.	D. Both a and b

11.	C. Sunflower										
<b><u>ASSERTION AND REASON:</u></b>											
12.	iv) Assertion is false, but reason is true.										
13.	i) Both assertion and reason are true, and reason is the correct explanation of the assertion.										
14.	c) Assertion is true, but reason is false.										
<b><u>VERY SHORT ANSWER TYPE QUESTIONS</u></b>											
15.	<p>Crossing of genetically dissimilar plants is called hybridisation.</p> <p>The different types of hybridisation are:</p> <p>a) Intergeneric -Crossing of plants belonging to different genera.</p> <p>b) Interspecific -Crossing of plants belonging to different species of the same genus</p> <p>c) Intervarietal- Crossing of plants belonging to the same species. The most commonly used type of hybridisation is Intervarietal.</p>										
16.	<table border="1"> <thead> <tr> <th>Mixed cropping</th><th>Intercropping</th></tr> </thead> <tbody> <tr> <td>Two or more crops in same field simultaneously randomly</td><td>Two or more crops in same field simultaneously in specific rows.</td></tr> <tr> <td>Individual attention to crops is difficult</td><td>It is easy to give individual attention to crops.</td></tr> <tr> <td>Harvesting and storage is difficult</td><td>Harvesting and storage is easy.</td></tr> <tr> <td>Doesnot increase productivity per unit area</td><td>Productivity per unit area is high for each crop.</td></tr> </tbody> </table>	Mixed cropping	Intercropping	Two or more crops in same field simultaneously randomly	Two or more crops in same field simultaneously in specific rows.	Individual attention to crops is difficult	It is easy to give individual attention to crops.	Harvesting and storage is difficult	Harvesting and storage is easy.	Doesnot increase productivity per unit area	Productivity per unit area is high for each crop.
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17.	It increases the water-holding capacity of the soil. It makes the soil porous and facilitates the exchange of gases. The texture of the soil improves. The number of microbes increases in the soil.										
18.	Higher yield, Improved quality, Disease resistance, and Wider adaptability.										
19.	The duration of light needed for the proper growth, flowering and development of a plant is called photoperiod.										
20.	<p>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. • 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.</p>										
21.	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 groundwater levels. The check-dams stop the rainwater from flowing away and also reduce soil erosion.										
22.	Weeds are responsible for extracting the nutrients which are essential for the main crops. Examples of weeds are Amaranthus, Chenopodium, Gajar Ghas, etc.										
<b><u>SHORT ANSWER TYPE QUESTIONS</u></b>											
23.	Insect pests attack the plants in three ways: (i) they cut the root, stem and leaf, (ii) they suck the cell sap from various parts of the plant, and (iii) they bore into the stem and fruits. They thus affect the health of the crop and reduce yields.										
24.	To get the best result, the farmer can try mixed cropping. Mixed cropping is growing two or										

	more crops simultaneously on the same piece of land. • Farmers can keep their fields under continuous production. • It enhances the productivity of the farmland.								
25.	<p>a. When compost is prepared by using earthworms to hasten the process, it's called vermicompost. Prior to the sowing of the crop seeds, some plants like sun hemp or guar are grown and then mulched by ploughing them into the soil. These green plants thus turn into green manure, which helps in enriching the soil nutrients.</p> <p>b. Advantages of Manure: Improves soil fertility. Reduces soil erosion and leaching. Improves the physical properties of the soil and aerates the soil. Improves the water and nutrient-holding capacity of the soil.</p>								
26.	<p>The growing of different crops on a piece of land in a pre-planned succession is called crop rotation.</p> <p>Criteria for the selection of crops for crop rotation:</p> <p>(i) Availability of moisture through rain or irrigation.</p> <p>(ii) Status of nutrients in the soil.</p> <p>(iii) Duration of crop - short or long.</p>								
27.	<p>There are sixteen nutrients which are essential for plants. Six are required in large quantities and are therefore called macronutrients. The other seven nutrients are used by plants in small quantities and are therefore called micronutrients</p> <table border="1" data-bbox="467 968 1089 1434"> <caption>Table 12.1: Nutrients supplied by air, water and soil</caption> <thead> <tr> <th>Source</th><th>Nutrients</th></tr> </thead> <tbody> <tr> <td>Air</td><td>carbon, oxygen</td></tr> <tr> <td>Water</td><td>hydrogen, oxygen</td></tr> <tr> <td>Soil</td><td> <p>(i) <i>Macronutrients:</i> nitrogen, phosphorus, potassium, calcium, magnesium, sulphur</p> <p>(ii) <i>Micronutrients:</i> iron, manganese, boron, zinc, copper, molybdenum, chlorine</p> </td></tr> </tbody> </table>	Source	Nutrients	Air	carbon, oxygen	Water	hydrogen, oxygen	Soil	<p>(i) <i>Macronutrients:</i> nitrogen, phosphorus, potassium, calcium, magnesium, sulphur</p> <p>(ii) <i>Micronutrients:</i> iron, manganese, boron, zinc, copper, molybdenum, chlorine</p>
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28.	<p>X intercropping Y crop rotation. Advantage of intercropping - This ensures maximum utilisation of the nutrients supplied and prevents pests and diseases from spreading to all the plants belonging to one crop in a field. This way, both crops can give better returns.</p> <p>Advantages of crop rotation - If crop rotation is done properly, then two or three crops can be grown in a year with good harvests.</p>								
<b>CASE STUDY BASED QUESTIONS</b>									
29.	<p>i) Frequent fungal diseases cause low yield and poor quality. PBW-343.</p> <p>ii) Crop variety improvement: The process of developing new crop varieties with improved traits such as high yield, disease resistance, and better quality. Desirable traits: (i) Disease resistance, (ii) Short maturity period.</p>								

	<p>iii) Genetically modified crops:</p> <p>a) Have higher yield and resistance to pests, diseases, drought, or salinity.</p> <p>b) Reduce dependency on chemical pesticides, improving overall productivity.</p> <p>iv) Traditional hybridisation is the process of cross-pollinating two different plants to combine their traits, while genetic modification (GM) directly alters a plant's DNA in a lab to introduce, delete, or modify specific genes.</p>
30.	<p>i) In intensive farming, crop yield starts high in 2006 due to heavy chemical fertiliser use but shows a gradual decline over the years (2006–2018). In organic farming, crop yield starts lower in 2006 but increases steadily over time due to improved soil fertility from organic manure. Overall trend: Intensive farming gives higher short-term yield, but organic farming shows sustainable improvement in crop yield over time.</p> <p>ii) i) Sandy soil: Sandy soil has large pores, so water drains quickly. Adding organic manure increases humus content and improves water-holding capacity, allowing plants to retain water longer. (ii) Clay soil: Clay soil already has high water retention but poor aeration. Adding organic manure improves soil structure, aeration, and microbial activity while maintaining water-holding capacity.</p> <p>iii) Organic manure releases nutrients slowly and improves soil structure, benefitting long-term soil health. Chemical fertilisers provide immediate nutrients for faster growth, but may not improve soil structure and can lead to soil degradation over time.</p>

### **LONG ANSWER TYPE QUESTIONS**

31.	<table border="1"> <thead> <tr> <th>Macro-nutrients</th><th>Micro-nutrients</th></tr> </thead> <tbody> <tr> <td>1. The nutrients that are required by the plant in greater amounts are known as macro-nutrients.</td><td>1. The nutrients that are essential for the plant in lesser amounts are known as micro-nutrients.</td></tr> <tr> <td>2. 0.2 to 0.4 % of dry weight of plant.</td><td>2. 0.1 to 0.02% of dry weight of the plant.</td></tr> <tr> <td>3. Nitrogen, phosphorous, potassium, sulphur, calcium and magnesium.</td><td>3. Boron, manganese, chlorine, iron, zinc, copper, nickel and molybdenum.</td></tr> </tbody> </table> <p>ii. Compost is made from waste that has undergone biological breakdown by using microbes. Vermicompost is produced when the decomposition of organic waste occurs, and to speed up the decomposition, earthworms are used. It provides nutrients that are soluble in water, acts as a soil conditioner, and is used to treat sewage.</p>	Macro-nutrients	Micro-nutrients	1. The nutrients that are required by the plant in greater amounts are known as macro-nutrients.	1. The nutrients that are essential for the plant in lesser amounts are known as micro-nutrients.	2. 0.2 to 0.4 % of dry weight of plant.	2. 0.1 to 0.02% of dry weight of the plant.	3. Nitrogen, phosphorous, potassium, sulphur, calcium and magnesium.	3. Boron, manganese, chlorine, iron, zinc, copper, nickel and molybdenum.
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	<table><tr><th>Manure</th><th>Fertilizer</th></tr><tr><td>Manure is an organic substance that is obtained from decomposition of vegetables and animal waste.</td><td>Fertilizers are inorganic substances manufactured in factories.</td></tr><tr><td>Manures are relatively less rich in plant nutrients, they only remove general deficiency of soil.</td><td>Fertilizers are very rich in plant nutrients like Nitrogen <i>N</i>, Phosphorus <i>P</i>, Potassium <i>K</i>.</td></tr><tr><td>They add humus to soil by providing organic substances and nutrients.</td><td>They ensure healthy growth and development of plants by providing nutrients however lack to add humus to soil.</td></tr></table>	Manure	Fertilizer	Manure is an organic substance that is obtained from decomposition of vegetables and animal waste.	Fertilizers are inorganic substances manufactured in factories.	Manures are relatively less rich in plant nutrients, they only remove general deficiency of soil.	Fertilizers are very rich in plant nutrients like Nitrogen <i>N</i> , Phosphorus <i>P</i> , Potassium <i>K</i> .	They add humus to soil by providing organic substances and nutrients.	They ensure healthy growth and development of plants by providing nutrients however lack to add humus to soil.	
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	biotic— insects, rodents, fungi, mites and bacteria, and abiotic— inappropriate moisture and temperatures.									
32.	<p>i) Stored grains are to be protected from various abiotic and biotic factors. This includes a) Proper cleaning and drying of the produce before storage. b) Cleaning and keeping granaries and storage areas free of moisture. c) Using pesticides in storage areas before storage. Fumigating storage areas.</p> <p>ii)</p> <table><tr><th>Cereals</th><th>Pulses</th></tr><tr><td>Cereals are crops rich in carbohydrate content.</td><td>Pulses are crops rich in protein content.</td></tr><tr><td>E.g.: Rice</td><td>E.g.: Green gram</td></tr></table>		Cereals	Pulses	Cereals are crops rich in carbohydrate content.	Pulses are crops rich in protein content.	E.g.: Rice	E.g.: Green gram		
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33.	<p>i) Organic farming is considered a sustainable agricultural method as it is the farming practice which involves minimum use of chemicals. Here, the farmers use biopesticides, biofertilizers, etc., to increase productivity. Hence, this agricultural practice does not degrade or pollute any resource and at the same time gives high yield and better-quality products.</p> <p>ii) In mixed cropping and intercropping, the soil is being exploited as two or more crops are grown at the same time. In crop rotation, crops are grown one after the other. So, the soil is not overused. Furthermore, one of the crops in the planned cycle is a legume, which helps the soil regain its fertility. It is thus considered a sustainable technique as it does not degrade the soil as a resource.</p>									
34.	<p>i) Parthenium (Gajor ghas) is an invasive weed which grows with rabi crops and is also toxic for cattle as well as humans. Protection of crop- Removal of Parthenium and burning it. Growing Cassia near the field can prevent the spreading of Parthenium. Weeds absorb nutrients and water from the soil and cause a deficiency of nutrients and water for the original crop.</p> <p>ii) Various factors responsible for loss of grains during storage-</p> <p>i) Abiotic factors – Improper moisture (present in food grains), humidity (of air) and temperature.</p> <p>ii) Biotic factors- insects, rodents, birds, worms, bacteria, fungi and mites. Before</p>									

	<p>storage- Sun Drying, Maintenance of hygiene, like the containers and gunny bags used for storing food should be clean, dry and properly fumigated. (Or any) After storage- Regular monitoring of the godowns (hygienic condition, moisture/humidity, light), using pesticides as per requirement.</p>
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<p><i>Prepared by:</i> <i>Ms Ranjana S</i></p>	<p><i>Checked by</i> <i>HOD Science</i></p>
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