9. CHALLENGES IN IMPROVING AGRICULTURAL PRODUCTION

TEACHING TASK (Page 40 – 42)

NEET LEVEL QUESTIONS

Multiple Choice Questions

1) What is the primary nutrient found in Panchgavya?

Answer: D) Organic matter

Explanation: Panchgavya, a traditional organic formulation made from cow-derived products, is primarily valued for its organic matter content, which enriches soil fertility and supports microbial activity.

2) Which method utilizes earthworms to decompose organic waste?

Answer: A) Vermicomposting

Explanation: Vermicomposting involves the use of earthworms to break down organic waste into nutrient-rich compost, enhancing soil fertility.

3) What is the primary purpose of green manure crops?

Answer: B) To enhance soil fertility

Explanation: Green manure crops, such as sunhemp or clover, are grown and plowed back into the soil to improve its nutrient content, particularly nitrogen, and enhance soil structure.

4) Which agricultural practice emphasizes the use of natural manures and organic pest control methods?

Answer: C) Organic farming

Explanation: Organic farming relies on natural manures, compost, and biological pest control methods to maintain soil health and avoid synthetic chemicals.

5) What do leguminous plants contribute to the soil?

Answer: A) Nitrogen

Explanation: Leguminous plants have nitrogen-fixing bacteria in their root nodules, which convert atmospheric nitrogen into a form usable by plants, thus enriching the soil with nitrogen.

6) Which nutrient is commonly found in concentrated organic manures?

Answer: A) Nitrogen

Explanation: Concentrated organic manures, such as oilseed cakes (e.g., groundnut or sesame), are rich in nitrogen, making them effective for boosting plant growth.

7) What is the primary purpose of soil testing?

Answer: B) To assess soil fertility

Explanation: Soil testing is conducted to evaluate the nutrient content and pH of the soil, helping farmers determine the appropriate fertilizers or amendments needed for optimal crop growth.

8) Which season typically experiences the highest rate of water evaporation from plants?

Answer: C) Summer

Explanation: Summer, with its high temperatures and longer daylight hours, leads to increased transpiration and evaporation from plants compared to other seasons.

9) Which crop is not commonly grown as a mixed crop?

Answer: D) Sunflower

Explanation: Sunflower is typically grown as a monoculture due to its growth habits and resource requirements, whereas crops like pea, wheat, and corn are often used in mixed cropping systems.

10) What is the primary benefit of using drip irrigation?

Answer: B) Minimizing soil erosion

Explanation: Drip irrigation delivers water directly to the plant roots, reducing runoff and soil erosion while also conserving water. While it also helps in efficient water use, minimizing soil erosion is a key benefit in this context.

ADVANCED LEVEL QUESTIONS

Multi Correct Answer Type

11) What are the primary nutrients required by plants for growth?

Answer: A) Nitrogen, B) Phosphorus, C) Potassium

Explanation: Nitrogen, Phosphorus, and Potassium (NPK) are the primary macronutrients essential for plant growth, supporting processes like photosynthesis, root development, and overall vigor. Calcium is a secondary nutrient.

12) Which practices contribute to sustainable soil nutrient management?

Answer: A) Crop rotation, B) Organic manure application, C) Green manure crops, D) Soil testing

Explanation: All these practices contribute to sustainable soil nutrient management by maintaining soil fertility, improving nutrient availability, and preventing depletion.

13) What are the benefits of using organic manure in agriculture?

Answer: A) Enriches soil fertility, B) Improves soil structure, C) Increases microbial activity, D) Enhances water retention

Explanation: Organic manure provides nutrients, improves soil texture, promotes beneficial microbial activity, and increases the soil's ability to retain water, all of which enhance agricultural productivity.

Assertion and Reason Type

14) Assertion: Organic farming practices promote sustainable agriculture.

Reason: Organic farming emphasizes the use of natural manures, crop rotation, and biological pest control methods, which contribute to soil health and environmental sustainability.

Answer: A) Both Assertion and Reason are true, and Reason is the correct explanation for Assertion.

Explanation: Organic farming promotes sustainability by using natural inputs and practices that enhance soil health and reduce environmental impact, as explained by the Reason.

15) Assertion: Vermicompost enhances soil fertility and reduces reliance on chemical fertilizers.

Reason: Vermicompost is rich in nutrients and beneficial microorganisms, which improve soil structure and nutrient availability, leading to healthier plant growth.

Answer: A) Both Assertion and Reason are true, and Reason is the correct explanation for Assertion.

Explanation: Vermicompost improves soil fertility through its nutrient content and microbial activity, reducing the need for chemical fertilizers, as the Reason correctly explains.

16) Assertion: Panchgavya, a liquid manure made from cow-derived ingredients, is beneficial for crop yields.

Reason: Panchgavya contains nutrients and beneficial microorganisms that enhance soil fertility and promote plant growth when used as a natural fertilizer.

Answer: A) Both Assertion and Reason are true, and Reason is the correct explanation for Assertion.

Explanation: Panchgavya enhances crop yields by providing nutrients and microorganisms that improve soil health, as correctly explained by the Reason.

Matrix Matching Type

17) Matching Soil Nutrients with their Sources

Answer:

Nitrogen → C. Green manure crops such as sunhemp and lobia

Phosphorus → B. Concentrated organic manures like groundnut and sesame seed powders

Potassium → D. Micronutrients required in smaller quantities like Iron and Manganese (Note: Potassium is a macronutrient, but this seems to be the intended match based on context)

Cultivating Mixed Crops → A. Growing more than one type of crop in the same field to maintain soil fertility

Explanation:

Green manure crops like sunhemp and lobia fix nitrogen in the soil.

Concentrated organic manures are rich in phosphorus.

Potassium is often supplemented through other sources, but in this context, it is paired with micronutrients for balance.

Mixed cropping maintains soil fertility by diversifying nutrient demands.

Comprehension Type

18) Irrigation plays a critical role in agricultural productivity...

1) What was the purpose of the experiment described in the passage?

Answer: C) To investigate the relationship between water supply and crop production

Explanation: The experiment compared irrigated and unirrigated fields to study the impact of water supply on crop production, with nitrogen levels controlled to isolate the effect of irrigation.

2) Which factor was kept constant between the irrigated and unirrigated fields in the experiment?

Answer: B) Nitrogen levels

Explanation: The passage states that both fields received equal amounts of nitrogen to eliminate bias in nutrient availability.

3) What conclusion can be drawn from the experiment?

Answer: C) Irrigation enhances crop production even with equal nitrogen supply

Explanation: Since nitrogen levels were controlled, any difference in crop production would likely be due to irrigation, suggesting that irrigation enhances yields.

LEARNERS TASK (Page 42 – 44)

NEET LEVEL QUESTIONS

Multiple Choice Questions

1) Which factor plays a significant role in increasing crop production?

Answer: A) Type of seeds

Explanation: The quality and type of seeds (e.g., high-yielding varieties) significantly influence crop production by determining yield potential.

2) What is the primary challenge in increasing agricultural production?

Answer: A) Limited land availability

Explanation: Limited arable land is a major constraint in increasing agricultural production, as it restricts the area available for cultivation.

3) Which method involves growing different types of crops together in the same field?

Answer: C) Mixed cropping

Explanation: Mixed cropping involves growing multiple crops simultaneously in the same field to diversify production and reduce risk.

4) What is the aim of crop rotation?

Answer: C) To maintain soil fertility

Explanation: Crop rotation alternates crops to prevent nutrient depletion, reduce pests, and maintain soil health.

5) Which practice involves supplying water drop by drop to minimize wastage?

Answer: C) Drip irrigation

Explanation: Drip irrigation delivers water directly to plant roots in small amounts, minimizing wastage and improving efficiency.

6) Which factor directly affects a plant's ability to absorb carbon dioxide?

Answer: C) Water availability

Explanation: Water is essential for photosynthesis, as it influences stomatal opening, which allows carbon dioxide absorption.

7) What is the primary nutrient found in green leaf manure?

Answer: A) Nitrogen

Explanation: Green leaf manure, derived from nitrogen-fixing plants, is primarily rich in nitrogen, which enhances soil fertility.

8) Which agricultural practice involves rotating different crops across seasons?

Answer: B) Crop rotation

Explanation: Crop rotation involves planting different crops in succession across seasons to maintain soil health and reduce pest pressure.

9) What is the primary benefit of using high yielding crop varieties?

Answer: C) Increasing overall yield

Explanation: High-yielding varieties are bred to maximize crop production per unit area, increasing overall yield.

10) Which method involves applying natural manure made from cow-derived products?

Answer: C) Panchgavya

Explanation: Panchgavya is a natural manure made from cow-derived products like dung, urine, milk, curd, and ghee, used to enhance soil fertility.

ADVANCED LEVEL QUESTIONS

Multi Correct Answer Type

11) Which factors contribute to increased food production in agriculture?

Answer: A) Developing high yielding crop varieties, B) Proper irrigation and fertilizer use, C) Crop rotation, D) Controlling pests and weeds

Explanation: All these factors—high-yielding varieties, efficient irrigation and fertilization, crop rotation, and pest/weed control—enhance agricultural productivity.

12) What are the benefits of crop rotation in agriculture?

Answer: A) Maintains soil fertility, B) Reduces pest and disease pressure, C) Diversifies crop production, D) Balances nutrient depletion

Explanation: Crop rotation maintains soil fertility, reduces pest and disease buildup, diversifies production, and balances nutrient use in the soil.

13) Which crops are commonly grown together in mixed cropping systems?

Answer: A) Soya bean with Pea, B) Pea with Green gram, C) Corn with Black gram, D) Groundnut with Sunflower

Explanation: These crop combinations are commonly used in mixed cropping to optimize resource use and reduce pest pressure. (Note: Sunflower is less common but can be paired with groundnut in some systems.)

Assertion and Reason Type

14) Assertion: Increasing crop production requires effective management of water resources.

Reason: Water is essential for plant growth and plays a crucial role in various physiological processes, including photosynthesis and nutrient transport.

Answer: A) Both Assertion and Reason are true, and Reason is the correct explanation for Assertion.

Explanation: Effective water management is critical for crop production, as water supports key plant processes, as explained by the Reason.

15) Assertion: Crop rotation helps maintain soil fertility.

Reason: Different crops have different nutrient requirements and interact with the soil in unique ways, contributing to overall soil health when rotated effectively.

Answer: A) Both Assertion and Reason are true, and Reason is the correct explanation for Assertion.

Explanation: Crop rotation maintains soil fertility by balancing nutrient demands and improving soil health, as the Reason explains.

16) Assertion: Drip irrigation is a practical solution for minimizing water wastage in agriculture.

Reason: Drip irrigation delivers water directly to the roots of plants, reducing evaporation and ensuring efficient water use.

Answer: A) Both Assertion and Reason are true, and Reason is the correct explanation for Assertion.

Explanation: Drip irrigation minimizes water wastage by targeting water delivery, as correctly explained by the Reason.

Matrix Matching Type

17) Match the following agricultural techniques with their benefits:

Answer:

Crop Rotation → C. Maintaining soil fertility and reducing pests by alternating crops

Vermicompost → B. Enhancing soil fertility and reducing reliance on chemical fertilizers

Organic Farming → D. Enriching soil nutrients with natural manure and improving soil health

Green Manure Crops → A. Growing specific crops to plough back into the soil to enrich it with nutrients

Explanation: Each technique is matched with its primary benefit in sustainable agriculture.

Comprehension Type

18) Soil nutrients play a crucial role in sustaining agricultural productivity...

1) Which statement best describes the role of soil nutrients?

Answer: C) Soil nutrients are essential for plant growth and development

Explanation: The passage emphasizes that soil nutrients are vital for plant growth and development, supporting various physiological processes.

2) What is one method mentioned in the passage to accelerate nutrient replenishment in the soil?

Answer: D) Adding organic manure

Explanation: The passage implies that farmers use organic matter (e.g., manure) to replenish soil nutrients, as natural decomposition is insufficient.

3) Why is the natural process of nutrient replenishment insufficient for modern agriculture?

Answer: C) It is too slow to meet commercial needs

Explanation: The passage states that natural nutrient replenishment is insufficient due to the high demands of modern agriculture, which requires faster nutrient cycling.

TEACHING TASK (Page 47 - 49)

NEET LEVEL QUESTIONS

Multiple Choice Questions

1) Which of the following is a synthetic nutrient commonly used in agriculture?

Answer: C) Urea

Explanation: Urea is a synthetic nitrogen fertilizer widely used in agriculture, unlike compost, earthworms, or nitrogen-fixing bacteria, which are natural.

2) What is the primary role of chemical fertilizers in agriculture?

Answer: C) Providing essential nutrients to crops

Explanation: Chemical fertilizers supply essential nutrients like nitrogen, phosphorus, and potassium to enhance crop growth and yield.

3) Which nutrient is not typically found in NPK fertilizers?

Answer: D) Magnesium

Explanation: NPK fertilizers contain Nitrogen, Phosphorus, and Potassium. Magnesium is a secondary nutrient not typically included in NPK formulations.

4) What is an essential consideration when applying fertilizers to crops?

Answer: C) Timing and method of application

Explanation: Proper timing and method of fertilizer application ensure optimal nutrient uptake and minimize waste or environmental harm.

5) What does Graph-3 suggest about the relationship between nitrogen fertilizer and crop yield?

Answer: C) There is an optimal level of nitrogen fertilizer for maximum crop yield

Explanation: Excessive nitrogen can lead to diminishing returns or crop damage, indicating an optimal level for maximum yield (assuming Graph-3 shows a parabolic relationship, common in such studies).

6) Which factor can lead to imbalances in soil nutrients when using only nitrogenous fertilizers?

Answer: C) Overuse of chemical fertilizers

Explanation: Overusing nitrogenous fertilizers can deplete other nutrients (e.g., phosphorus, potassium), causing imbalances in soil fertility.

7) What is a primary benefit of maintaining weed-free fields?

Answer: B) Improved nutrient availability to crops

Explanation: Removing weeds reduces competition for nutrients, water, and sunlight, making more resources available to crops.

8) Which of the following is not a common weed found in paddy fields?

Answer: C) Wheat

Explanation: Wheat is a crop, not a weed, whereas nutgrass, barnyard grass, and Bengal dayflower are common weeds in paddy fields.

9) What role do beneficial insects play in agriculture?

Answer: B) They prey on harmful pests

Explanation: Beneficial insects, such as ladybugs or parasitic wasps, control pest populations by preying on harmful insects, supporting crop health.

10) What is a potential consequence of indiscriminate use of insecticides?

Answer: B) Soil contamination

Explanation: Indiscriminate insecticide use can lead to soil contamination, harming soil health and non-target organisms.

ADVANCED LEVEL QUESTIONS

Multi Correct Answer Type

11) What methods are commonly used for weed management in agriculture?

Answer: A) Manual weeding, B) Herbicide application, C) Mulching, D) Crop rotation

Explanation: These methods effectively control weeds by physically removing them, chemically targeting them, covering soil to suppress growth, or disrupting weed cycles through crop rotation.

12) What are the negative impacts of indiscriminate insecticide use in agriculture?

Answer: A) Soil contamination, B) Water pollution, C) Harm to beneficial insects, D) Long-term health effects on farmers

Explanation: Indiscriminate insecticide use can contaminate soil and water, harm beneficial insects like pollinators, and pose health risks to farmers.

13) What are the natural methods for pest control in agriculture?

Answer: A) Predatory insects, B) Fungal and bacterial agents, C) Crop rotation with mixed crops, D) Beneficial microorganisms

Explanation: These natural methods control pests sustainably by using biological agents and agricultural practices to reduce pest populations.

Assertion and Reason Type

14) Assertion: Insecticides pose concerns due to their potential persistence in the soil and contamination of water sources.

Reason: Insecticides are chemical substances designed to kill insects but can have adverse effects on the environment and human health, including soil contamination and water pollution.

Answer: A) Both Assertion and Reason are true, and Reason is the correct explanation for Assertion.

Explanation: Insecticides can persist in soil and pollute water, causing environmental and health issues, as the Reason explains.

15) Assertion: Natural pest control methods involve the use of beneficial insects and microorganisms to combat harmful pests in crops.

Reason: Certain insects and microorganisms play a beneficial role in controlling pests by preying on harmful pests or inhibiting their growth, offering a sustainable alternative to synthetic pesticides.

Answer: A) Both Assertion and Reason are true, and Reason is the correct explanation for Assertion.

Explanation: Natural pest control relies on beneficial organisms, as described, making the Reason a correct explanation.

16) Assertion: Crop rotation with mixed crops is an effective strategy for pest control and disease prevention in agriculture.

Reason: Planting different crops in succession can disrupt pest life cycles, reduce pest populations, and minimize the spread of diseases, contributing to overall crop health and productivity.

Answer: A) Both Assertion and Reason are true, and Reason is the correct explanation for Assertion.

Explanation: Crop rotation disrupts pest and disease cycles, as the Reason explains, making it an effective strategy.

Matrix Matching Type

17) Match the following types of pests with their control methods:

Answer:

Weeds → B. Manual weeding and physical removal

Insects → C. Use of natural predators and beneficial insects

Plant Diseases → D. Application of fungicides and pesticides

Synthetic Pyrethroids → A. Controlling pests while minimizing environmental and health risks

Explanation: Each pest type is matched with its appropriate control method, with synthetic pyrethroids used cautiously to balance efficacy and safety.

Comprehension Type

18) Insects and plant diseases pose significant threats to agricultural crops...

1) What role do certain insects play in agricultural ecosystems?

Answer: C) They aid in pollination, facilitating plant reproduction

Explanation: The passage highlights that some insects aid in pollination, which is crucial for plant reproduction.

2) How can insects negatively impact agricultural crops?

Answer: C) By attacking stems, leaves, or roots

Explanation: The passage states that insects damage crops by attacking stems, leaves, or roots, reducing yield and quality.

3) What is one method farmers can use to manage insect populations in crops?

Answer: C) Encouraging the growth of beneficial insects

Explanation: Encouraging beneficial insects is a sustainable method to control pest populations, as implied by the passage.

LEARNERS TASK (Page 49 - 51)

NEET LEVEL QUESTIONS

Multiple Choice Questions

1) Which natural method can be used for pest control in crops?

Answer: D) Crop rotation

Explanation: Crop rotation is a natural pest control method that disrupts pest life cycles, unlike synthetic pyrethroids or chemical pesticides.

2) What is the primary concern associated with the use of chemical insecticides?

Answer: B) Human health risks

Explanation: Chemical insecticides pose risks to human health through exposure, contamination, or residues, making this a primary concern.

3) Which farming practice involves planting different crops in succession to control pests?

Answer: C) Crop rotation

Explanation: Crop rotation involves planting different crops in succession to reduce pest populations and maintain soil health.

4) What is the primary purpose of Akarshaka Pantalu?

Answer: B) Controlling pest populations

Explanation: “Akarshaka Pantalu” likely refers to a pest control initiative or trap crop system in Andhra Pradesh, aimed at managing pest populations.

5) Which district in Andhra Pradesh is mentioned for its common use of pesticides and insecticides?

Answer: B) Guntur

Explanation: Guntur is known for its intensive agriculture (e.g., chili and cotton), where pesticide and insecticide use is common.

6) What is the significance of Trichoderma species and Bacillus thuringiensis in agriculture?

Answer: C) They are natural pest controllers

Explanation: Trichoderma and Bacillus thuringiensis are biological agents used to control pests and diseases naturally in agriculture.

7) Which farming technique relies on beneficial insects to control pests?

Answer: B) Organic farming

Explanation: Organic farming emphasizes biological pest control, including the use of beneficial insects, to manage pests sustainably.

8) What is the primary goal of sustainable agricultural practices?

Answer: B) Minimizing environmental impact

Explanation: Sustainable agriculture aims to balance productivity with minimal environmental harm, preserving resources for future use.

9) Which factor is crucial for achieving sustainable farming outcomes?

Answer: C) Staying informed about innovative techniques

Explanation: Knowledge of innovative, sustainable techniques is essential for adopting practices that enhance productivity while protecting the environment.

10) What is a key challenge in modern agriculture addressed in the passage?

Answer: D) Balancing food production with environmental concerns

Explanation: Modern agriculture faces the challenge of meeting food demands while minimizing environmental degradation, as implied by sustainable practices.

ADVANCED LEVEL QUESTIONS

Multi Correct Answer Type

11) Which chemical fertilizers are commonly used in agriculture?

Answer: A) Urea, B) NPK (Nitrogen, Phosphorus, Potassium), C) Superphosphate

Explanation: Urea, NPK, and superphosphate are widely used synthetic fertilizers to provide essential nutrients to crops.

12) What factors influence crop production besides seed quality and proper irrigation?

Answer: A) Timely sowing, B) Correct fertilizer application, C) Adequate weed management, D) Pest and disease control

Explanation: These factors are critical for optimizing crop production by ensuring proper growth conditions and protection.

13) Which weeds are commonly found in paddy fields?

Answer: A) Echinochloa crus-galli (barnyard grass), B) Cyperus rotundus (nutgrass), C) Commelina benghalensis (Bengal dayflower)

Explanation: These are common weeds that compete with rice crops in paddy fields, affecting yield and quality.

Assertion and Reason Type

14) Assertion: Weeds compete with crops for essential resources, hindering crop growth and reducing yields.

Reason: Weeds can reduce the availability of nutrients to crops, hinder sunlight penetration to crop leaves, and compete for water resources.

Answer: A) Both Assertion and Reason are true, and Reason is the correct explanation for Assertion.

Explanation: Weeds reduce crop yields by competing for resources, as the Reason accurately explains.

15) Assertion: Chemical fertilizers like Urea and NPK are synthetic nutrients manufactured for agricultural use.

Reason: Chemical fertilizers are not naturally occurring and are synthesized to provide specific nutrients to crops in agriculture.

Answer: A) Both Assertion and Reason are true, and Reason is the correct explanation for Assertion.

Explanation: Urea and NPK are synthetic fertilizers designed to deliver specific nutrients, as explained by the Reason.

16) Assertion: Effective weed management is crucial for maximizing crop production and ensuring healthy yields.

Reason: Weeds can deprive crops of essential resources such as nutrients, sunlight, and water, ultimately reducing crop growth and yields.

Answer: A) Both Assertion and Reason are true, and Reason is the correct explanation for Assertion.

Explanation: Effective weed management ensures crops have access to resources, as the Reason explains.

Matrix Matching Type

17) Match the following agricultural inputs with their effects on crop production:

Answer:

Chemical Fertilizers → D. Enhancing soil fertility and providing synthetic nutrients

Organic Manure → C. Improving soil health and nutrient availability naturally

Crop Protection Measures → B. Preventing damage from weeds, insects, and plant diseases

Beneficial Insects → A. Preying on harmful pests and reducing the need for chemical insecticides

Explanation: Each input is matched with its primary effect on crop production and soil health.

Comprehension Type

18) Ensuring proper nutrient management in agriculture is essential...

1) What factors should farmers consider when applying nutrients to crops?

Answer: B) Timing and method of application

Explanation: The passage emphasizes that timing and method of application are crucial for optimizing nutrient uptake.

2) Why is it important to understand the effectiveness of nutrient availability to plants?

Answer: C) To optimize crop yields

Explanation: Effective nutrient availability ensures maximum crop growth and yield, as stated in the passage.

3) Which of the following is NOT a method mentioned in the passage for applying nutrients to crops?

Answer: D) Broadcasting from an airplane

Explanation: The passage mentions sprinkling, mixing with irrigation water, and placement beneath the soil, but not broadcasting from an airplane.