01 The theme of World Soil day 2020, according to the Food and Agriculture Organization (FAO) campaign, is "Keep soil alive, protect soil biodiversity".

(a) What is soil biodiversity ?

(b) Why is soil biodiversity important ?

(a) Soil biodiversity reflects the mix of living organisms in the soil.

(b) Organisms improve the entry and storage of water, resistance to erosion, plant nutrition, and break down of organic matter.

02 Terms related to agricultural practices are given below. Rearrange them in the correct sequence.

Harvesting, sowing, manuring, tilling and ploughing, irrigation, weeding.

Define the terms in the given box.

The correct sequence in the series of agricultural practices is: Tilling and ploughing ⟶ Sowing ⟶ Manuring ⟶ Irrigation ⟶ Weeding ⟶ Havesting

1. Tilling and ploughing It is the turning and loosening of soil to encourage growth of earthworms and microbes. It is the first step in preparation of soil.
2. Sowing After soil preparation, good and healthy seeds are selected and sowed to considerable depths in soil by either traditional or modern methods.
3. Manuring it is done to add humus, improve texture of soil as well as to replenish nutrients in soil.
4. Irrigation Crop fields are watered at regular intervals to provide moisture for growth and germination of seeds.
5. Weeding is removal of weeds that grow naturally between crops and compete with them for sunlight, space, water and nutrients. They should be removed before weeds mature, i.e. produce flowers and seeds,
6. Harvesting It is the process of cutting and gathering mature crops. It can be done manually by sickle or by harvester machine.

03 As a part of eco-club activity, students were asked to raise a kitchen garden in the school premises. They were provided with some materials given in the box.

Khurpi, water-can, spade, shovel

List the other materials you would require. How will you plan the garden ? Write the steps.

Besides the given tools, the other items required for raising a garden are seeds and seedling of vegetables, plants from nursery, kitchen waste, manure, water, soil.

Steps for raising the garden:

1. Kitchen waste will be collected and composted in a pit.
2. A patch of land will be identified for the garden, with adequate sunlight available.
3. Soil will be dug up and levelled with the help of a spade.
4. Sowing of seeds/ transplanting of seedlings will be done. Seeds should be uniformly placed with adequate spacing,
5. Select seeds/seedlings as per the season. Water the plants regularly with a water-can.
6. Compost will be applied.

Weeds will be removed periodically with the help of khurpi.

04 Rajan felt worried about the condition of water scarcity in his village during the cropping season. He went to Ministry of Agriculture and Farmers Welfare of his area to get the solution of this problem. There he came to know about effective method of irrigation and drought resistant varieties of crop.

He requested the head of department of the ministry to arrange some workshop on this topic to educate the farmers in these methods.

(a) Name modern methods of irrigation that help us to use water economically.

(b) What is drought resistant varieties of crop ?

(c) Can you name some crops that require less amount of water ?

(d) What value of Raj an is shown here ?

(a) Drip irrigation system and sprinkler method.

(b) Crops that need very little amount of rainfall or irrigation to grow are called drought resistant varieties of crop.

(c) Sorghum, pearl millet, chickpea, groundnut, etc.

(d) Rajan is concerned, aware, sensitive and intelligent.

05 Despite being one of the growing economies, our country still has a large section of population going hungry and malnourished. Do you think an efficient crop production mechanism is the only solution to this? Discuss in the class what else needs to be done to root out hunger and malnutrition from our country.

India, a growing economy with agriculture is a main contributor in its growth. Agriculture is science of cultivating plants, animals and other life forms for food and other sources, Despite large production of crops by agricultural practices, people still go hungry and malnourished. This happens because of inefficient crop production and management. In India, an increase in production of food grains has been observed from 1960 to 2004. With efficient management, the crop production can be enhanced and improved to feed the country's poor.

A few steps in this direction can be:

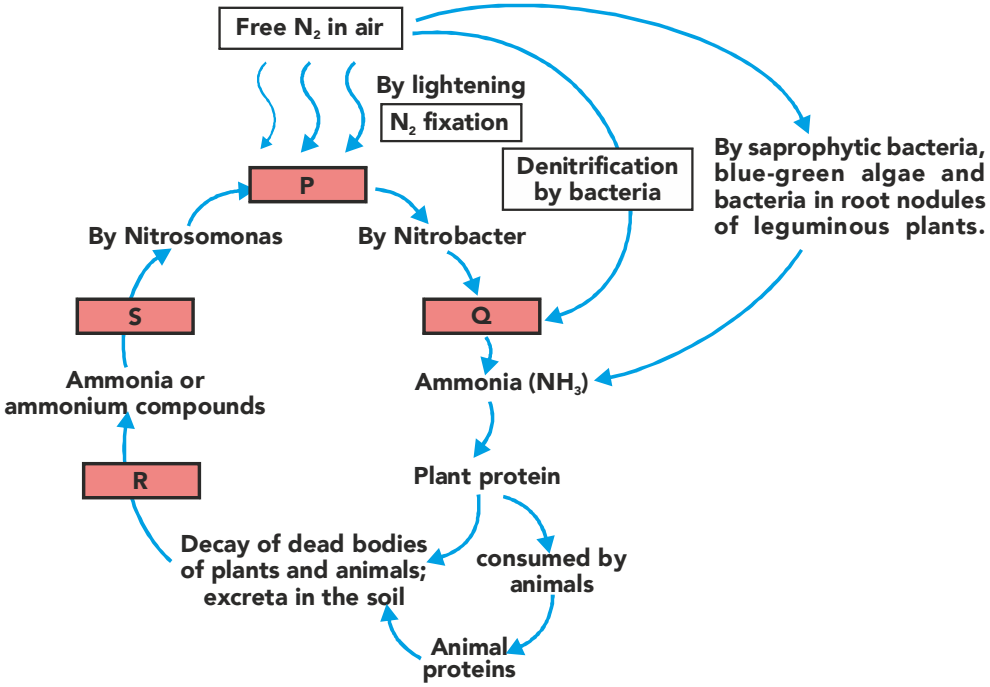
1. Selection of high field seeds for planting: The seeds with increased yield and reduced growth period.
2. Management of crop production: The financial aspects of agriculture should be made more approachable to farmers at all levels.
3. Information regarding Use of chemicals, manures, cropping patterns, nutrient quality and irrigation facilities should be discussed and propagated among farmers.

4. Protection of crops: The agricultural produce should be shared efficiently to reduce the microbial, pest or other organisms from infesting the produce.Pest and weed control measures should be adopted.

A large amount of crops get spoiled during storage by different living and non-living factors. Living factors include rodents, microbes and insects.

Non-living factors are moisture, temperature and hygiene of storage place. Keeping these factors in mind, we can reduce the economic losses, increase the marketability and feed the country's poor.

06 Try to understand the regular circulation of nitrogen through air, soil, plants and animals given in the figure and answer the following.



i) Name the methods by which gaseous nitrogen of air may be fixed into soil.

a) Physico chemical – discharge of electricity in atmosphere (lightening, thunder storm etc.)

b) Biochemical –

1) Activity of certain saprophytic bacteria.
(Eg: Clostridium, azoto bacter aerobic).

2) Activity of symbiotic. Eg: Bacteria (Rhizobium).

3) Activity of blue-green algae.

Eg: Nocstoc anabaena.

ii) Identify products 'P' and 'Q'.

iii) What is nitrification ?

iv) State the significance of the nutrient cycle shown in the given figure.

1. i) Methods by which nitrogen may be fixed are as follows

- Physico chemical – discharge of electricity in atmosphere (lightening, thunder storm etc.)
- Biochemical – 1) Activity of certain saprophytic bacteria. (Eg: Clostridium, azoto bacter aerobic).

2) Activity of symbiotic. Eg: Bacteria (Rhizobium).

3) Activity of blue-green algae. Eg: Nocstoc anabaena.

ii) NO_2 (nitrite/s) and NO_3 (nitrate/s)

iii) Conversion of organic nitrogen compound by nitrifying bacteria in the soil. Eg: Ammonia into nitrates which can be absorbed by plants is called as nitrification.

Ammonia is first converted to nitrites by nitrosomonas bacteria and nitrites to nitrates by nitrobacter species.

iv) The given Figure shown is identified to be of 'Nitrogen cycle'. Significance of 'Nitrogen cycle' is as follows:-

- N_2 cycle is a natural biogeochemical cycle that fixes atmospheric nitrogen to the soil.
- Soil micro organisms living in nodules of legume convert nitrogen to nitrates.
- Helps to enrich soil in nitrates essential for growth of plants.
- Nitrites and nitrates are taken up by plant bodies to synthesise proteins.
- Decay of plants and animals convert to humus. Nitrates of humus are converted to N_2 and put back to atmosphere.