DIGITAL TEXT BOOK 7

LET'S CULTIVATE AND REAP GOODNESS

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Fig.7.1

Have you noticed the diligent student who is receiving the 'Karshaka Pratibha Award' for being the best student farmer of the state government, for producing high-quality vegetables at a low cost?

- What do the government aim in giving away such awards to children?
- Do you know anyone who has achieved similar success in agriculture? What activity in the agricultural sector made them notable? **CLICK HERE TO SEE THE VIDEO**

Mathew Benny from Idukki rearing 13 cows

Let us take a look at a portion of the report submitted by this student farmer to the award selection committee. Read the given excerpt of the report.

I am a student of Class VIII. My family consists of my father, mother and a sister. We have our own house and a fifteen-cents of land. My father is a small scale businessman.

I became more interested in farming when I visited a farm as part of my school activities. Then I gathered more information by contacting experts in the field of agriculture. Considering the space constraint, I made precise plans and started farming. I mainly cultivate beans, bitter gourd, bringal, lady finger, ivy gourd, mint, spinach, green chilli and tomato.

After meeting our household needs, we can also sell the vegetables, and through this, we can earn about Rs. 2,000 per week.

I have been receiving unconditional support and cooperation from the Agriculture Office, Gram Panchayat Administration, and the Agricultural Cooperative Society. Recently, I have also been utilising some online services.

Weren't you happy on hearing about our friend's success story?

There are many individuals in our state who have achieved success in the field of agriculture. Prepare a note by examining the news paper reports based on the indicators.

School student seeks patent for tapioca harvester

A school student has garnered media attention for developing a simple machine for harvesting tapioca. This little scientist has applied for a patent for his invention.

Success in banana leaf

Edappal: Instead of banana bunches, a young postgraduate farmer from Edappal has scripted a new success story through the marketing of banana leaves. The idea struck when banana bunches were selling at a low price, prompting him to think: 'What if I sell banana leaves instead?'

Student's leafy greens shop

A college student's startup, aimed at utilising the market value of nutrient rich leafy greens achieved record sales within a year of its inception.

Entrepreneur through turmeric cultivation

Wayanad: A young man who started turmeric cultivation on two acres of land faced difficulties during harvest time due to low market prices. When he realised that numerous value-added products could be made from turmeric, he became a new entrepreneur.

New brand for Gandhakshala

Gandhakshala, the valuable variety of rice was cultivated in a unique way and it was launched in the market under a special brand, received a good response in the market. Inspired by this, more young entrepreneurs are planning to start cultivation at more places.

Indicators

- What are the ideas have you learned from the news reports?
- What are the circumstances that have prompted farmers to choose new ways?
- What are the other possibilities to make farming profitable?

Innovative agricultural initiatives can strengthen rural economies, enhance food security, and inspire future generations to engage in farming.

What types of support are available for those starting a new venture? Complete the given illustration 3.1.

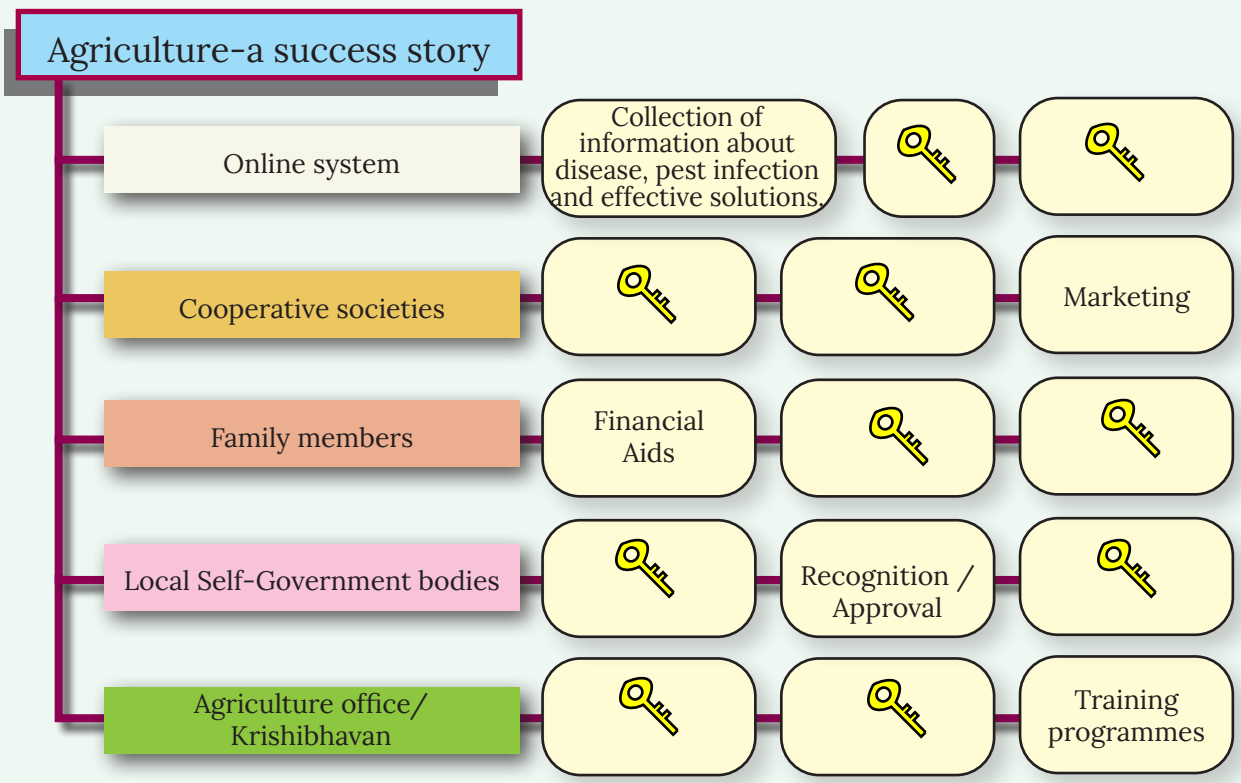


Illustration 7.1

Will you try to elaborate the illustration?

Maximising Land Utilisation

Our young farmer presents a model as a guiding example for those who regret the lack of space for farming.

Collect information on government initiated programmes to support new entrepreneurs and present it in your class.

figure 7.2 provides insights into how he has effectively utilised his 15-cent plot of land to the fullest.

Discuss the possibilities and limitations of each method shown.

Sack farming

Aquaponics

Pet bottle farming

Vertical farming

Pot cultivation

Terrace farming

Fig. 7.2

Vertical farming is an innovative method to overcome space constraints. What are its possibilities? **CLICK HERE TO SEE THE VIDEO**

Observe figure 7.3 and prepare a note based on the indicators through discussion.

Fig. 7.3

Indicators

- How does it help to overcome space constraints?
- How does it ensure availability of light?
- How does it help to reduce the use of water?
- Construction cost

Implement a vertical farming system at school or home at a low cost?

Present a picture of your vertical farming setup along with a brief description of its construction in the class?

Vertical Farming

Vertical farming is an innovative agricultural method where crops are grown in vertically stacked layers. A key feature of vertical farming is that it utilizes the possibilities of hydroponics and aeroponics. It can be implemented even in urban areas with limited space by incorporating artificial lighting and protective structures to shield crops from rain and sunlight, farming can be carried out independent of climatic conditions, making it a significant advantage of this method.

Application of Fertiliser

Fertilisers are commonly used in farming, aren't they?

What is the necessity of applying fertilisers?

Examine the given description and note down your conclusions.

Plant nutrients

Fig. 7.4

The elements required by plants are obtained from the soil. Of these, nitrogen, potassium, phosphorus, calcium, magnesium, and sulphur are the elements required in large quantities. These are called macronutrients. However, elements such as barium, boron, zinc, copper, manganese, iron, molybdenum, chlorine, and nickel are required only in very small quantities. These are known as micronutrients. Fertilisers are applied to ensure that crops receive all the essential nutrients for their growth.

Indicators

- Macronutrients and Micronutrients
- Need for the application of fertilisers

Some fertilisers are spread on the field before or after planting. Liquid fertilisers are sprayed on the leaves while others are mixed with water and sprayed. Using different methods depending on the type of crop and solid ensures better yields.

You learned how to produce organic manure at a low cost using bio bins, the previous classes. Will you take the initiative to set up a similar system at home?

CLICK HERE TO SEE THE VIDEO

As you know different types of fertilisers are used in agriculture.

Complete the illustration 7.2 below.

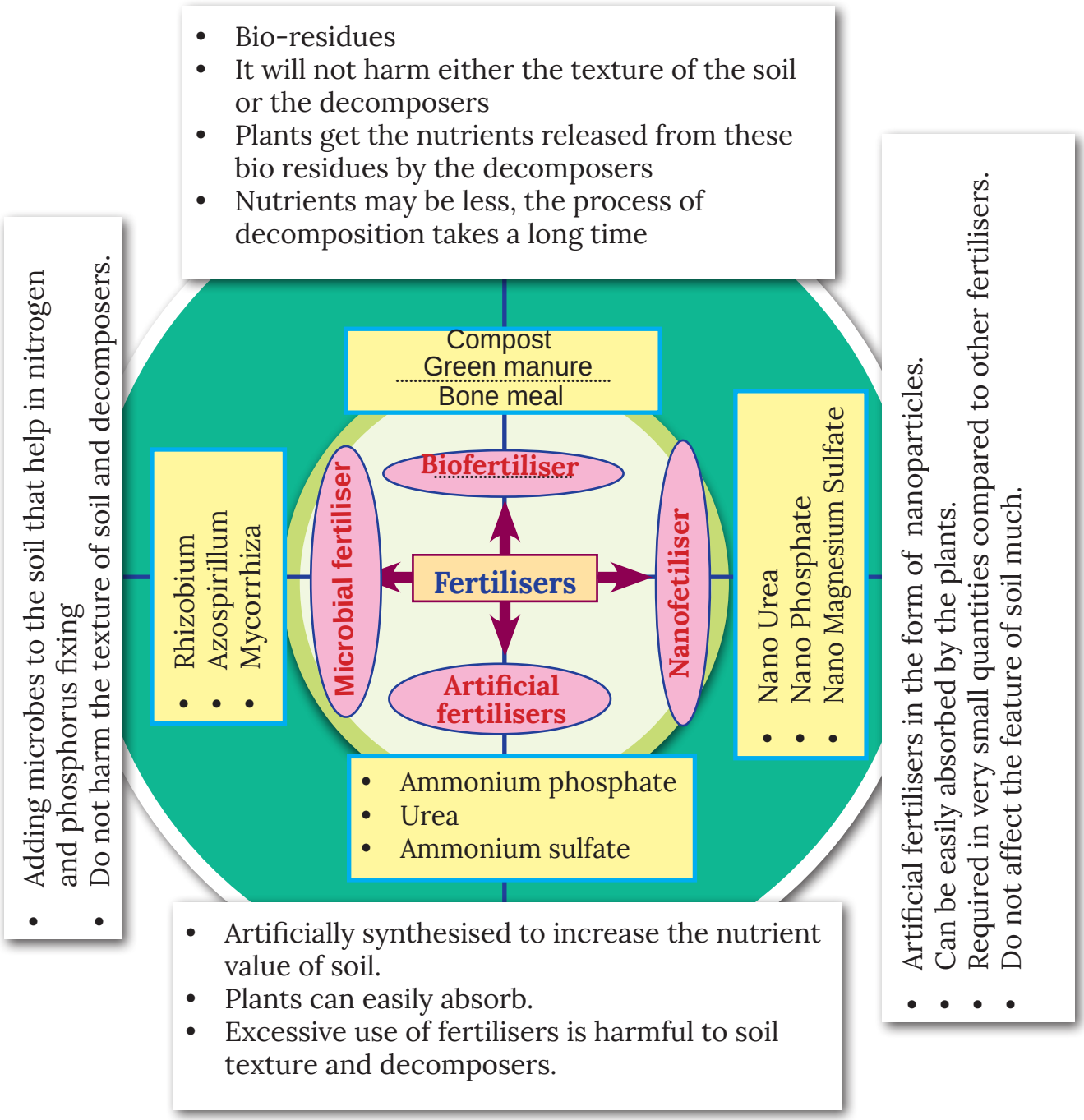


Illustration 7.2

Gather more information related to this and present a seminar paper in class on the topic 'Different types of fertilisers - advantages and limitations'.

While preparing the seminar paper consider the following facts also.

- The advantages and limitations of each type of fertiliser.
- Soil testing and application of fertilisers.
- Fertigation and irrigation

Fig. 7.5

Leaf colour chart

CLICK HERE TO SEE THE VIDEO

This is an easy way to find out the availability of nitrogen in crop plants. It helps to find out how much nitrogen fertilisers need to be added by comparing the colour of leaves of plants with a standard picture. Light green colour indicates the deficiency of nitrogen. Dark green colour indicates that nitrogen is present in adequate quantities.

The more you give, the more you receive.

All the nutrients absorbed by plants eventually reach us through the food we consume, don't they?

The quantities of various nutrients present in 100 grams of edible vegetables from a study are given in Table 7.1.

By examining the table, collect more information about the necessity of including local vegetables in the diet.

Vegetable	Protein (gram)	Fibre (gram)	Carbo-hydrate (gram)	Calcium (milligram)	Iron (milligram)	Carotene (milligram)	Vitamin C (milligram)
Colocasia leaf	3.9	2.9	6.8	227	10	10278	12
Curry leaf	6.1	6.4	18.7	830	0.93	7560	4
Drumstick leaves	6.7	0.9	12.5	440	0.85	6780	220
Sweet amaranth	6.8	1.4	11.6	570	28.0	5706	247
Cabbage	1.8	1.0	4.6	39	0.8	120	124
Beetroot	1.7	0.9	18.3	18.3	1.19	0	3
Cauliflower	2.6	1.2	4.0	33	1.23	30	56

Table 7.1

Fig. 7.6

Local varieties are naturally well-suited to the local environment. Since they have inherent resistance to pests and diseases, the use of pesticides can be minimised. By supporting local pollinators and beneficial insects, they help maintaining ecological balance. As these crops require minimal fertilisers and pesticides, cultivation costs can also be reduced.

Isn't it possible to grow such local vegetables in home gardens? They can enrich your kitchen garden to a nutrition garden.

Set up a nutrition garden in the school premises and document your experiences.

For better yield high quality planting materials

We get high yield when we use high quality planting materials. Observe the illustration 7.3 showing the methods of production of high yield planting materials. Prepare notes on it.

Illustration 7.3

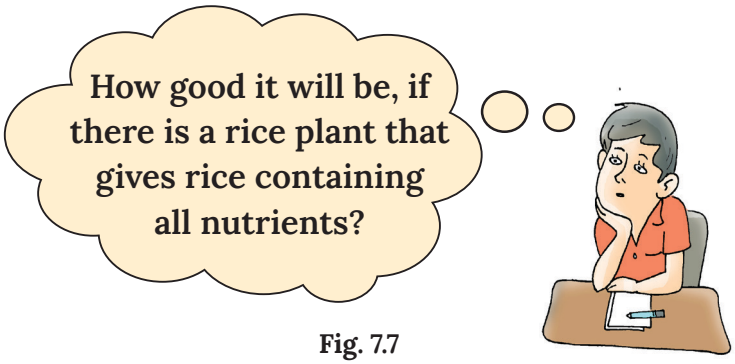


Fig. 7.7

Do you have the same opinion? Analyse the description given and draw inferences.

Fig. 7.8

GM Crops (Genetically modified crops)

In crops new traits can be incorporated by altering its genetic constitution through genetic engineering. Cotton plant that resists pest attack, soyabean that resist weedicides, rice varieties that contain vitamin A etc are examples for these crops.

Fig. 7.9

Tissue culture

This technique helps to produce a large number of plants having all the characteristics of the parent plant. Tissues seperated from the suitable of a plant all grown in special nutrient medium to produce saplings.

The methods of grafting, budding, layering and tissue culture are adopted to produce saplings having the characteristics of the parent plant.

We have learned in previous classes that with a little training, we can do grafting, budding, and layering ourselves. But tissue culture requires more technical knowledge and training.

Collect more information about tissue culture and prepare a note for the bulletin board.

GM crops have many advantages. However, there is an opinion that these are a threat to the survival of indigenous species. Shall we interview experts in the relevant fields and prepare a report on these matters?

Utilisation of water

Observe the conversation between two farmers.

Fig. 7.10

What suggestions can you put forward to solve these problems.

- .....
- .....
- .....

Observe the given pictures and collect more information by field visits. Exhibit on science wall.

Examine the validity of your suggestions by analysing the description given below.

Green House CLICK HERE TO SEE THE VIDEO

This setup helps to cultivate both in rainy season and in summer season alike.

Green House is constructed using sheets of plastic, nylon, polyethylene etc. Pest attack also can also be reduced by this method as all the sides are covered.

Fig. 7.11

Fig. 7.12

Drip irrigation CLICK HERE TO SEE THE VIDEO

This is an irrigation method using pipes and valves to water the roots in drops. By doing this, loss of water is reduced to maximum. Another significance of this method is that the availability of water to all plants is ensured.

Fig. 7.13

Wick Irrigation CLICK HERE TO SEE THE VIDEO

A method of directly supplying water to the roots of plants through a cotton cloth filter from a water source is called wick irrigation. It requires less water than drip irrigation.

Fig. 7.14

Mulching CLICK HERE TO SEE THE VIDEO

This is the traditional method of covering the soil in the fields using dry leaves, hay etc to reduce water loss due to evaporation. Through this method it is possible to reduce the growth of weeds and to make the soil enriched.

Pest control

Below shown figures indicate a problem. Discuss.

A. Pod borer (Legume)

B. Leaf-rolling Caterpillar (Okra)Lady's finger

C. Stem Borer (Brinjal)

Fig. 7.15

Indicators

- Which are the major pests that affect the crops in our locality?
- Which are the different methods adopted to control pests by the farmers in your locality?

CLICK HERE TO SEE THE VIDEO

https://youtu.be/CELaZ62mkfY

Integrated Pest Management- IPM

You know that there are different methods for pest control. While selecting a pest control method, population density of the pest, nature of crop etc should be considered. The need of farmers is not to kill all the pests but control their multiplication without any harm to the crops. **CLICK HERE TO SEE THE VIDEO**

For this it is not always necessary to use pesticides that are harmful to the environment and human health. Integrated pest management is the use of mechanical pest control methods with different kinds of nets and traps, utilising friendly pests, use of resistant varieties of seeds for farming and reduce the use of pesticides. During instances of increased pest attack and the threat of crop loss, pesticides should be used only in suggested quantities, keeping the precautions.

Integrated Farming

Fig. 7.16

Farming is not only the cultivation of plants alone.

When birds, fish and other animals are raised along with crops, it is also farming. Integrated farming is the practice of nurturing diverse living organisms together. Visit an integrated farm in your locality and analyse illustration (1.5) based on indicators. Prepare a report on integrated farming. **CLICK HERE TO SEE THE VIDEO**

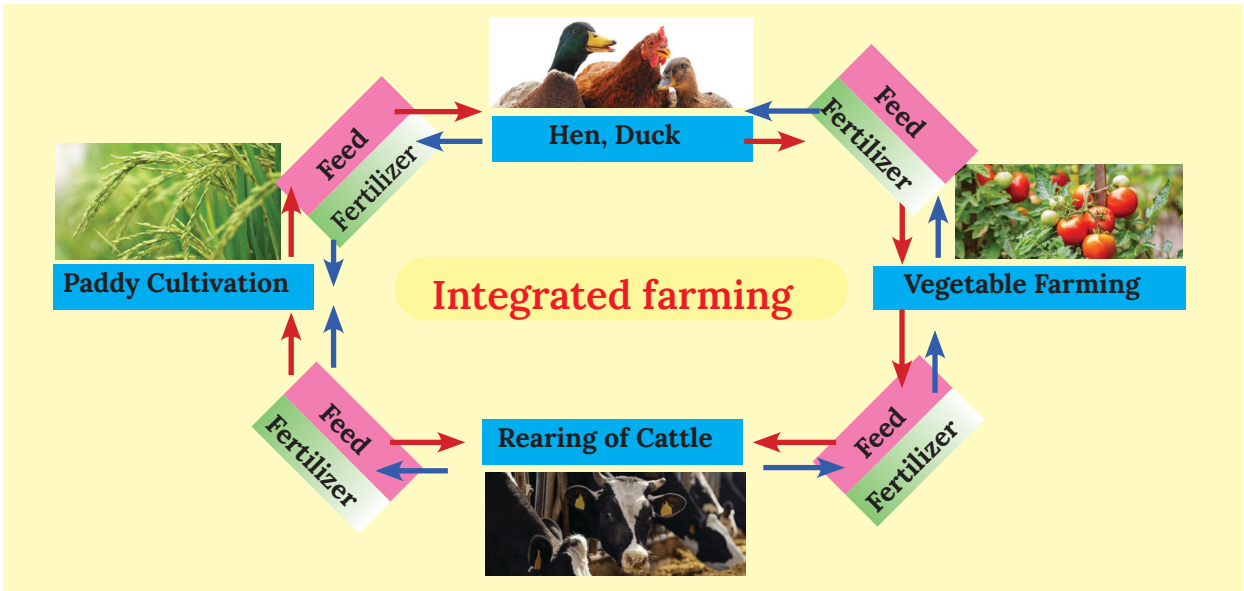


Illustration 7.4

Indicators

- Integrated farming-advantages and possibilities
- Food safety
- Reducing the cost of production

Smart Farming

Smart farming is the effective utilisation of modern technologies or practices in agriculture. Draw inferences based on the newspaper report and illustration 1.6.

The young farmer is the center of attention

Ernakulam: A young farmer in Ernakulam has become a role model by leaving his highly paid job in the IT sector to focus on farming. He has achieved great success by combining modern agricultural techniques with his IT expertise. He refers to his farming method as "Smart Farming".

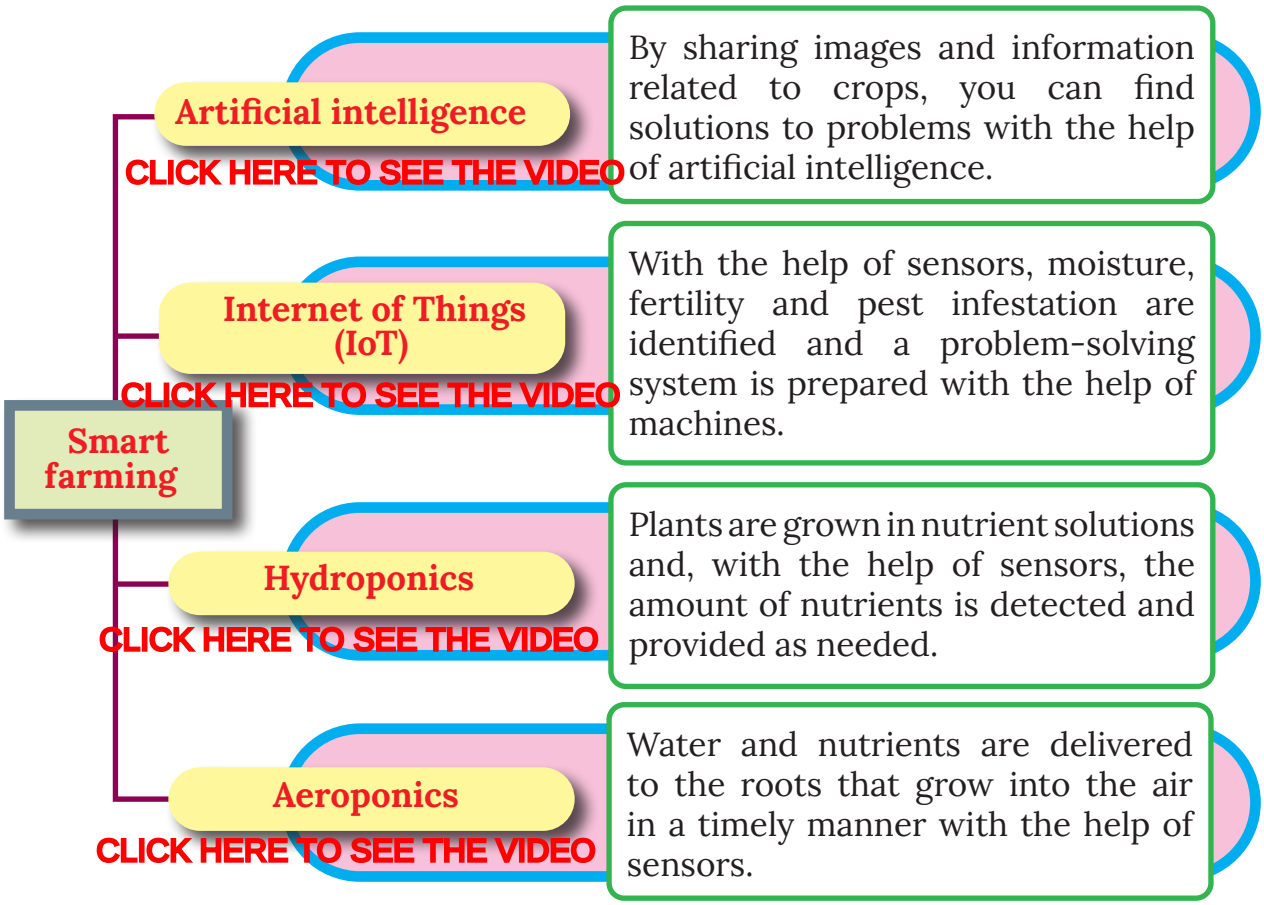


Illustration 7.5

Marketing

Is farming alone smart enough? In this era of online marketing, agricultural product marketing also needs to be smart. Making the processes from harvest to production visible to consumers directly can increase the credibility and market value of products. This can be easily achieved through sensors, drones, and AI cameras in farms. Through this it's also possible to deliver the products directly consumers worldwide and increase the global marketing potential of products with geographical indication (GI) tags.

Geographical indication

Efforts underway to get geographical indication status for Kerala cashew

Kollam: Kerala is making a move to obtain a Geographical Indication (GI) tag for its cashews, specifically under the name "Kerala Cashew". This effort is being driven by the Kerala State Cashew Development Agency's Special Officer, who has submitted a recommendation to the central government. The Ministry of Commerce and Industry has to review and approve the application.

Haven't you observed the news report? The Geographical Indication (GI) tag is granted based on the unique characteristics of the geographical area where the product is cultivated, resulting in distinct differences in the product's taste, colour, aroma, and nutritional value. This is why certain products from specific regions receive the GI tag. Such products get a premium value in the market.

Some examples for agriculture products that received geography index are given below. Find out more products.

Palakkadan Matta rice

Malabar pepper

Kuttiattoor Mango

Kodungallur pottuvellari

Tirur Vettila

Fig. 7.17

Diversity in Agriculture

Is agriculture only about producing food?

Analyse the given collage (Illustration 7.6) based on the indicators and prepare a note.

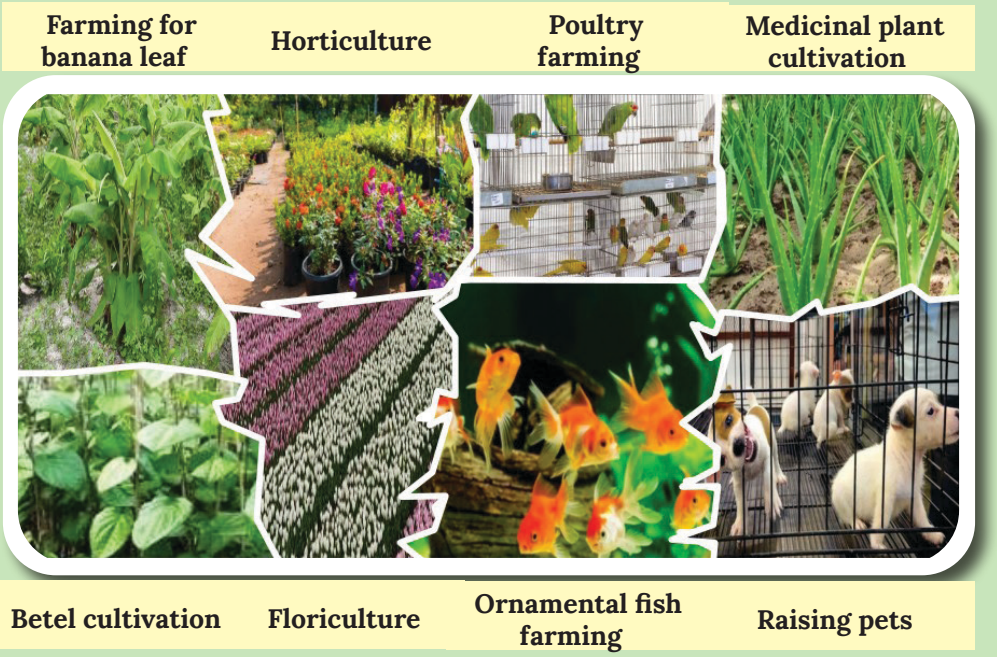


Illustration 7.6

Indicators

- What are the benefits of diversifying agriculture?
- Which of these can be done even by those with limited space?

Mobile apps for farmers

There are apps that provide weather forecasts, pest and disease alerts, expert agricultural advice, market price information, benefits for farmers and information on organic certification. If these facilities are properly utilised, the agricultural sector will undoubtedly flourish.

CLICK HERE TO SEE THE VIDEO

Ensuring nutritious food for all is a challenge. With day by day increasing population and changing food habits, expansion and modernisation of agriculture is of utmost importance.

Let's Assess

1) Arrange the information given in boxes A and B in the table suitably.

A	B
Space constraints Synthetic fertiliser Organic fertiliser	1) Vertical farming. 2) Manure 3) Urea 4) Vermicompost 5) Ammonium phosphate 6) Terrace farming 7) Bone meal 8) Sack farming 9) Superphosphate.

Space constraint	Synthetic fertiliser	Organic fertiliser
Vertical farming	Urea	Manure
Terrace farming	Ammonium Phosphate	Vermicompost
Sack farming	SuperPhosphate	Bonemeal

2) Satheesh has 15 cents of homestead land and 30 cents of paddy field. He says that paddy cultivation is not profitable. What suggestions do you have to make farming profitable by making use of homestead land and paddy field?

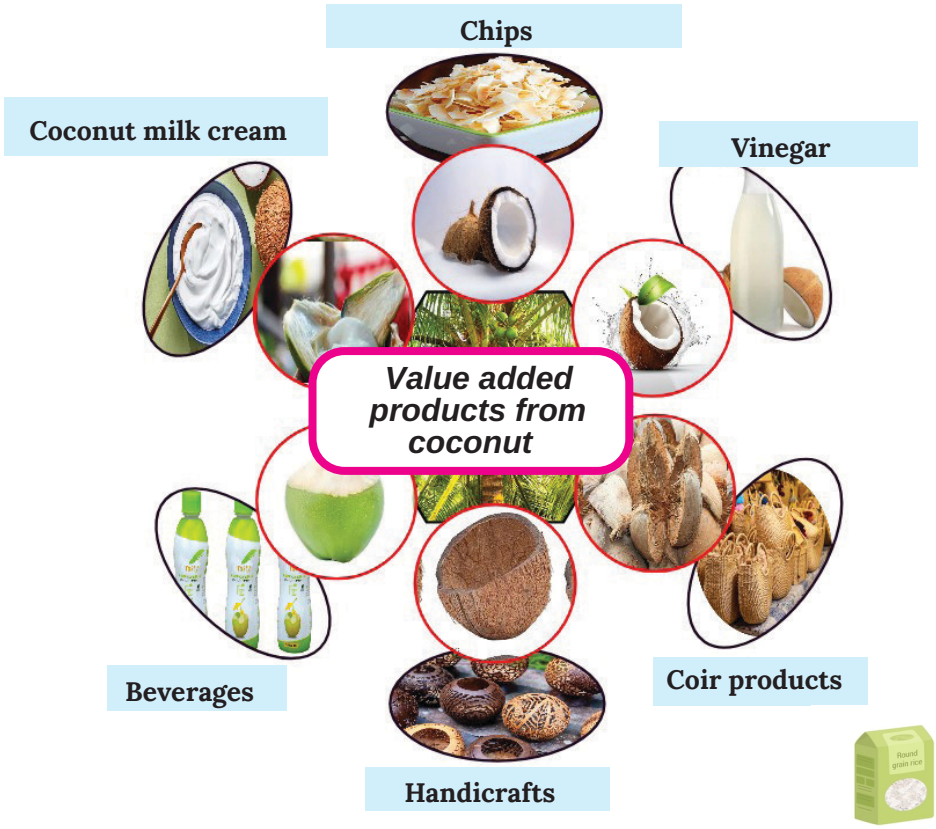
3) Which is the odd one? What are the common features of the others?

   a) Wick Irrigation, Vertical farming, Drip irrigation, Mulching

   b) Hydroponics, aquaponics, aeroponics, geographical indication

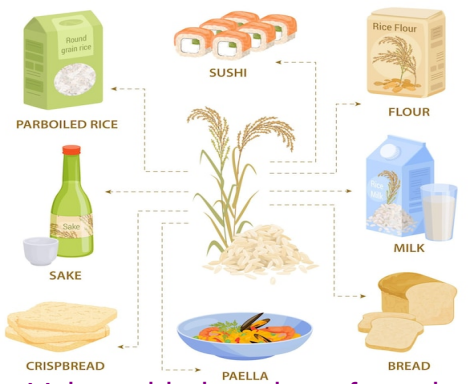
4) 'Farming will be profitable only if all the pests are killed.' What is your response to this comment of a farmer? How can effective pest control be implemented?

5) Observe the illustration.



a) What are the benefits to farmers by producing such products?

b) Prepare a similar illustration of any other crop.



Value added products from rice

Extended Activities

1) Find out the common plant diseases in your area. Prepare a pictorial chart listing their pathogens, mode of transmission, symptoms and remedies and display it on the bulletin board **CLICK HERE TO SEE THE VIDEO**

2) Collect information about the major agricultural research institutes in Keralam and their contributions to the agricultural sector and prepare a list of them. **CLICK HERE TO SEE THE VIDEO**

3) You know that many machines are used in the agricultural sector to reduce the effort. The results of thinking about how to alleviate the difficulties of farmers led to the discovery of most of the machinery seen today. Design a model of an innovative device that will be useful to the farmers in your area. **CLICK HERE TO SEE THE VIDEO**