



## 31

## AGRICULTURE, FORESTRY AND MEDICINAL PLANTS

Evolution of human civilization has depended mainly on agriculture. It has not only given man the freedom from the risks of hunting and collecting food from the forest but has also given assurance of continuous availability of food.

Agriculture plays an important role in providing basic necessities of mankind in three ways – food, clothes and shelter. In addition to agriculture, we draw many essentials for our living from nature. Forests play a very important role in providing useful products for man e.g. rubber, supporting wildlife, e.g., such as tiger and improving the environment. Medicinal plants many of them obtained from forests, provide important drugs, which are used for treating a large number of diseases. In this lesson, you will learn about agriculture, forestry and medicinal plants.



### OBJECTIVES

After completing this lesson, you will be able to:

- *state the major role of agriculture;*
- *classify the crops giving examples under each category and also mention their importance;*
- *briefly describe the cultivation of cereals crops viz wheat and rice along with cotton and sugarcane;*
- *define green revolution and list the factors that made it possible;*
- *explain the principles of farm management and the proper ways of storage of food grains;*
- *mention the utility and the method of establishing a kitchen garden;*
- *define the term forestry;*
- *name the different types of forests, appreciate their effects on ecosystem and enumerate the commercial products provided by it;*
- *list the common names of some medicinal plants giving their uses in treating various diseases.*



**Notes**

**31.1 ROLE OF AGRICULTURE**

Food and clothing are the basic needs of man. Whatever we eat in our daily life, most of them we get from plants. The clothes we wear are also made from plants e.g. cotton is a plant product. Plants provide most of the basic necessities of life to human beings. These include (1) Food (cereals, fruits, oil seeds etc.) (2) Fibres for making clothes (cotton, jute, etc.) (3) Beverages (tea, coffee, etc.) (4) Forests (timber, rubber etc.). Herbivores consume plants as their food. Plants can be of two types i.e. cultivated and wild plants.

**Cultivated and Wild plants**

Plants which are specially grown by humans are called **cultivated plants** e.g. wheat, rice. The plants that grow by themselves in nature are called **wild plants** e.g. bathua, cholai etc.

**31.2 CLASSIFICATION OF CROPS**

Crops are grown regularly in large numbers in fields for food or for obtaining other products. Crops are classified in a number of ways as follows:

**(i) According to use, crops may be classified into food crops and cash crops.**

**Table 31.1** Difference between food and cash crops

Food Crops	Cash Crops
1. They are grown to provide food and may be stored for a long period e.g. wheat, rice, vegetables.	1. Plants or plant products which can be sold and money can be earned out of it. e.g. tea, jute cashew nut, rubber, sugarcane.

**(ii) According to the season of growing, crops are classified into three types-**

1. Rabi crops (grown in winter) : Wheat, gram, pea etc.
2. Kharif (grown in monsoon rainy season) : Maize, jowar, bajra etc.
3. Ziad crops (grown during summer) : Melon, cucumber, water melon etc.

**(iii) According to the edible parts of the plant, the crops are termed as follows :**

- |                               |  |
|-------------------------------|--|
| 1. Cereal crops (seed grains) | - Wheat, rice, maize etc.                |
| 2. Fruit crops                | - Mango, apple, grape, banana etc.       |
| 3. Vegetable crops            | - Ladiesfinger, tomato, cauliflower etc. |
| 4. Stem crops                 | - Potato, sugarcane, colocasia etc.      |
| 5. Root crops                 | - Radish, carrot, sweet potato etc.      |
| 6. Leaf crops                 | - Spinach, mustard (sarson), maithi etc. |



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(iv) The most widely used general classification of crops are-

### 1. Cereal Crops

Cereals are used as food not only in India but all over the world. They are rich in carbohydrates and grown for food. It includes wheat, rice, maize, bajra, barley, rye, oat, sorgham (jowar), ragi etc. These are consumed by animals as well as by human.

### 2. Pulse Crops

It includes all the types of 'dals' (pulses) we use as a food, these are also called as leguminous plants. They are rich sources of protein e.g. sweet peas, gram, pigeon pea (arhar), soyabean, beans, ground nut, lentil etc.

#### Agricultural importance of pulse crops

All leguminous plants have special nodules (swellings) in their root system and these contain bacteria. (Fig 31.1) These bacteria fix atmospheric nitrogen directly and change it into nitrogen compounds. This process is known as **nitrogen-fixation**. These nitrogen compounds are used by the plants as a natural nitrogen fertilizer. For this reason farmers practise crop rotation i.e. they grow a pulse crops in between two cereal crops to enrich the soil to get a better yield of the crop.



Fig. 31.1 Leguminous plants contain nodulated bacteria.

### 3. Fruit crops

- (i) Fruits are rich in vitamins, mineral and carbohydrates. Fruits provide vitamins, minerals and variety to our diet. Some fruits are also a rich source of sugar e.g. grape, banana and mango.
- (ii) Fruits are consumed fresh or in the form of juice, jam etc. examples – mango, apple, banana, oranges, pomgranate etc.
- (iii) Fruit trees are usually perennial trees, which bear fruits once a year. Many fruit crops are grown in India examples – chickoo, mango, apple, orange etc.

### 4. Vegetables Crops

Vegetables provide minerals, proteins and carbohydrates. A large number of vegetables are grown in our country. Some important ones are e.g. potato, tomato, pea, cauliflower, brinjals, gourds etc.



**Notes**

**5. Stem Crops**

Ginger, potato, onion, garlic, colocasia are the examples of stem crops. Sugarcane is the main source of sugar in our country. Sugarcane is an annual cash crop.

**6. Root Crops**

Carrots, radish, sweet potato and turnip are the examples of root crops.

**7. Leaf Crops**

Spinach, Methi, Corainder, Mint and mustard are the examples of leaf crops.

**8. Oil Seed Crops**

Oils are an important part of our food. They are a rich source of energy. Seeds of some crops yield oil on being pressed in machines. The remainder becomes the seed cake to be used as cattle feed. Some of the oil yielding crops are groundnut, cottonseed, coconut, mustard and sunflower.

**9. Fibre Crops**

The two most important fibre crops of our country are cotton and jute. They supply the raw materials for our textile and jute industries.

**Retting**

The process by which the fibres are separated from the jute plant is called retting.

In this process we make small bundles of plants. These bundles are kept in side pond or canal 15 days. During this period degradation process occurs in the presence of certain bacteria, and the fibres are separated easily, they are then washed and dried.



**INTEXT QUESTIONS 31.1**

1. Give the difference between cultivated plants and wild plants.  
.....
2. Give two examples each of Rabi crop and Kharif crop.  
.....
3. Match the items in Column I with those in Column II
 

Column I	Column II
1. Pulse crops	A. a nutritious fruit
2. Oil seed crop	B. ground nut
3. Soya bean	C. rich source of protein.
4. Banana	D. nitrogen fixing bacteria
4. Name four oil seed crops.  
.....

**31.3 CULTIVATION OF WHEAT, RICE, COTTON AND SUGARCANE****(a) Cultivation of wheat**

Wheat belongs to the family Poaceae (Graminae). The grains are rich in carbohydrates. This is the winter season crop. Method of cultivation are as follows :

1. Area of production UP, Punjab, Haryana, Rajasthan, Madhya Pradesh, Bihar, Maharastra etc.
2. Soil grow in loamy soil
3. Climate Cool weather with moderate rainfall
4. Temperature 10-15°C (during winter season)
5. Irrigation 4-5 times its cultivation
6. Harvesting April to May in northern India
7. Botanical Name *Triticum vulgare*

**(b) Cultivation of rice crop**

Rice is one of the major crop of India. About 23 percent of the total cultivated area of the country cultivates this crop. Method of rice cultivation is as follows -

1. Area of production UP, Bihar, West Bengal, Assam, Andhra Pradesh, Punjab, Tamil Nadu, Orissa
2. Soil deep fertile loamy, clayey loam, loamy
3. Climate Tropical and moist with 125 cm rainfall
4. Temperature 20-25°C
5. Irrigation every week, soil should not be dry
6. Harvesting September -October in northern India
7. Botanical Name *Oriza sativa*

**(c) Cultivation of cotton**

Cotton is one of the major crops of India. The fibre of cotton is used as raw material for the textile industry. Cotton seeds after extraction of the oil are also used as a cattle feed. Methods of cotton cultivation is as follows -

1. Area of production Punjab, Haryana, Maharastra, Gujarat, Andhra Pradesh, Rajasthan, Karnataka, Madhya Pradesh, Tamil Nadu
2. Soil Black cotton soil of deccan plateau and alluvial soil of the northern plain.
3. Climate cloud free weather for about 150 days with 75 cm rainfall at the time of flowering and boll opening
4. Rainfall moderate rainfall of about 75 cm
5. Specific characters
  1. Indian cotton is used for coarse cloth
  2. Fruit is capsule
  3. Oil is used for cooking and oil cake for feeding cattle.
6. Botanical Name *Gossypium sp.*

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**(d) Cultivation of sugarcane**

Sugarcane is the main source of sugar in our country. This is an annual and cash crop. India is the original land of this crop. Sugarcane is sown by “setts” (pieces of stem containing buds). Method of sugarcane cultivation is as follows -

1. Area of production Punjab, Haryana, UP, Bihar, Gujarat, Maharashtra, Karnataka, Andhra Pradesh, Tamil Nadu
2. Soil Heavy loamy soil
3. Climate hot and humid
4. Harvesting from mid February to mid March in North India. From 20th September to 20th October in West India and slightly earlier in south India.
5. Irrigation 1st after one month of sowing in summer on every 10th day. In winter on every 15th day
6. Botanical Name *Saccharum officinarum*

**31.4 GREEN REVOLUTION**

In 1952, the yield of Wheat and Rice was 654 kg and 800 kg per hectare, respectively. This yield was insufficient to fulfil the demand. Therefore our Government and Agriculture Scientists paid a special attention towards the improvement of agriculture. By doing so, the production of cereal crops increased tremendously and we became self-sufficient. The various steps taken to achieve this goal have been collectively termed as green revolution.

**Green Revolution:** Spectacular increase in the yield of crops, particularly cereals, through the application of modern techniques in agriculture is called **Green Revolution**

The factors which help to bring about the green revolution are:

1. Introduction of high yielding varieties of crops.
2. Multiple cropping, better irrigation and sufficient supply of fertilizers.
3. Use of crop protection measures against diseases and pest.
4. Transfer of the technology of scientific farming from research farms to villager farmers.
5. Organised transport arrangements to reach the produce from the fields to market.

**31.5 FARM MANAGEMENT**

**Effective farm management requires detailed planning for growing high yielding crops and their storage.**

There are various steps involved in farm management are as follows:

1. Correct preparation of the soil.
2. The right variety and quality of seeds or saplings for planting.

3. The right amount of water and time at which it has to be supplied.
4. The amount and time of application of fertilizers.
5. Timely application of pesticides.

After harvesting, proper storage of the crop is very important to avoid loss and wastage due to lack of transit from field to the consumer.

### 1. Proper storage of Food

Food is spoilt, by variations in temperature, humidity, insects, microorganisms, rodents, birds and animals. Food grains are therefore stored in waterproof and airtight containers. Small farmers, store the grain in jute bags in godowns with pucca floor, plain roof and single entrance. Special large sized godowns like silos are used these days at the government level.

### 2. Storage and Preservation of Fruits and Vegetables

Fresh fruit and vegetables are kept in cold storage at low temperatures to help retain their nutritive value and reduce losses from spoilage.

These are preserved by other methods also as given below-

- (i) Dehydration and Sun drying to remove water and thus prevent growth of micro-organism.
- (ii) Pickling by using large amounts of salt, vinegar and spices.
- (iii) Canning (storing in plastic or metallic cans)

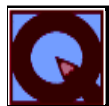
## 31.6 KITCHEN GARDEN

Kitchen garden is a small garden next to a house. It is grown mainly as a hobby but is becoming very popular these days. The persons living in house grow vegetables in earthen posts. Wooden boxes as well as in the soil beds.

The common vegetables grown in kitchen garden are cauliflower, brinjal, tomato, radish, potatoes, lady's finger, mint, onion etc. Some common fruit trees like lemon, papaya, custard apple, guava may also be grown.

The three main advantages of a kitchen garden are:

- (i) It provides a light exercise to the gardener.
- (ii) It adds beauty to the house.
- (iii) Fresh vegetables are available at any time.



### INTEXT QUESTIONS 31.2

1. Give botanical names of wheat and cotton and climatic conditions in which they are grown.  
.....
2. Give two advantages of green revolution.  
.....



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**Notes**

3. What is meant by farm management?  
.....
4. What is a kitchen garden? Give any one advantage.  
.....
5. Mention two ways of the storage of food.
  - (i) .....
  - (ii) .....

**31.7 WHAT IS A FOREST**

Just any kind of vegetation is not a forest. The rows of trees along the roadside is not a forest. A piece of land with hundred or more mango tree is again not a forest. The reeds and tall grasses growing along the bank of a river is also not a forest. Then what is a forest.

**A forest is a large area of land with a lot of vegetation but dominated by various types of trees. These trees are usually of different species and are of different age. Wild animals may or may not be present.**

**Forestry is the science of study of forest**

**31.7.1 Types of forests**

The different kinds of forests are:-

**1. Coniferous forest**

Trees with needle-like leaves with persistent foliage and cone bearing reproductive organs. Found in cold or temperate cold climates e.g. Pine, Cedrus (Deodar), Fir etc.

**2. Deciduous forest**

Most of the trees in such forests drop their leaves in winter and new leaves grow in springs. There are found in temperate warm and temperate cold climates e.g. Oak, beach, heath, hickory, bassword, chestnuts, bitch bine, cypress.

**3. Tropical rain forest**

Trees with broad-leaves, deciduous or evergreen. Such forest occur in warm climate. Zones of the world with high rainfall. Trees are covered with epiphytes and the soil in which humus large number of animals inhabit such forests e.g. vines, creepers, lianas and orchids.

**31.7.2 Importance of forest**

Forest plays an important role in various ways.

**1. Forest as an Ecosystem**

If you walk through a forest you may find various insects, birds, animals and wild beasts. There are different kinds of organisms living in close association with each other, feeding on others and being themselves eaten by some others. The ants,





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termites and bacteria break down the dead wood, the fallen leaves and the excreta of animals, into simpler compounds, which become a part of soil. The ultimate source of energy is the solar energy, which is trapped by the green leaves. This chain of getting food and energy goes on and on. Such a community of organisms along with its environment is called an ecosystem. Thus forest is an ecosystem.

## 2. Forests Improve the Environment in many ways

### (a) Forests release oxygen

Plants in forests take in large quantities of carbon-dioxide and improve the quality of air by releasing oxygen into the atmosphere during the process of photosynthesis.

### (b) Forests prevent soil erosion

Plants in forests check soil erosion in four ways :

- (i) Roots hold the soil particles together preventing them from being washed away
- (ii) Leaves and branches take much of the force of the falling rain thus checking the loosening of top soil.
- (iii) Trunks reduce the force of flowing waters, thus checking soil erosion as well as preventing floods.
- (iv) The tall trees reduce the wind velocity during storms and thus check the top soil from being blown away.

Thus the forests help in retaining the fertile topsoil not only in the forest but also in the neighbouring fields.

(c) The forest trees hold sufficient moisture in their root system.

(d) The forest trees release large quantities of water vapour through their leaves (by the process of transpiration) thus adding to the moisture in the atmosphere and brings rains.

Through these and many other similar ways the forest help in maintaining the quality of physical environment (climate, etc.)

## 3. Forests Support Wild Life

The wild animals are nature's great beauties and even more than that they maintain proper balance in their ecosystem through food chains. Many forests in our country have been specially reserved for preserving wild life. These also are a source of knowledge and provide recreation to people all over the world.

## 4. Forests provide Commercial Products

Forests are full of commercially important products. They provide us many materials e.g. wood, resin, lac etc. These basic products are used in making furniture, tyres, paints, varnishes, fuel etc. by different methods.

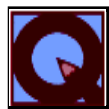


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**5. Forests supports Sericulture and Lac Culture**

Sericulture is the breeding and management of insects for the production of silk. You will know more about it in the lesson no.35. and lac is used in several ways. Its commercial use is in the polishing wooden furniture. The other common use is in sealing parcels, packets and envelopes. You will also learn more about the culture of lac in the lesson 35.

Forest maintains the proper balance of atmospheric gases and stabilizes the climatic conditions. They provide hundred kinds of usable materials. They are indeed a nation’s wealth. Forestry is a science in itself. Overall the forests are not only vital for the sustenance of life on earth but also provide a lot of usable materials.



**INTEXT QUESTIONS 31.3**

1. Mention four ways in which forest are useful
  - (i) .....
  - (ii) .....
  - (iii) .....
  - (iv) .....
2. How can forests help us in improving the environment?  
.....
3. List different types of forests ?  
.....

**31.8 MEDICINAL PLANTS**

Each one of us must have suffer from some disease or other in our life. For treatment, we depended upon medicines. Most medicines are obtained directly or indirectly from plants. All the major system of medicines such as Allopathy, Homeopathy, Unani and Ayurvedic use most of the drugs obtained from plants.

**31.8.1 History**

The history of the medicinal plants is as old as the history of human being. The primitive man attempted to cure his ailments with all sorts of materials around him including plants as well as animals. Discovery of their medicinal values was mainly by trial and error. For example, quinine is the drug for curing malaria and amla is effective in curing many diseases of the digestive system, the heart, the respiratory system and skin diseases.

All the early civilizations like the Egyptian, the Babylonians, the Sumerians, the Greeks and the Romans have mentioned a large number of modern medicines that were used in their time. In China, plants has been utilized as a source of drugs for more than 6000 years ago. Curative nature of various plants have been mentioned in the Bible and the Vedas. In India, the earliest reference of medicinal plants is

written in the Rigveda (3500-1800BC). A vast varieties of medicinal plants are described in the Atharavaveda (200-100 BC). After Vedas, two Indians named Charaka and Sushruta has worked on Indian system of medicine (Ayurveda) in the form of Charaka Samhita (1000BC-100AD) and Sushruta Samhita respectively. Sushruta Samhita deals with about more than 700 drugs.

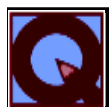
There are many plants, which provide medicines. These medicines are used for treating many diseases. These plants are described in tabular form as below (Table 31.2 on page 68-70)

### 31.8.2 Drugs obtained from other plants

In addition to the above mentioned higher plants, some very important drugs like the antibiotics are obtained from the lower plants like fungi e.g. Pencillin, Streptomycin, tetracycline etc. Similarly, Ergot, which is derived from another fungus *Claviceps purpurea*, is used in obstetrics for accelerating childbirth. It is also used extensively to increase blood pressure and for controlling uterine haemorrhage after child birth.

### 31.8.3 Central Drug Research Institute of India (CDRI)

This is located in Lucknow. Here extensive research is done on the drugs their sources, extraction and effects. Regular attempts are made to fine out new medicines from herbs for treating various diseases.



### INTEXT QUESTIONS 31.4

- Match correctly the name of the drug with the disease against which it is effective, by writing the corresponding number within brackets.

Drug	Disease
(a) Reserpine      ( )	(i) Malaria Fever
(b) Alloin        ( )	(ii) Jaundice, Diabetes
(c) Quinine        ( )	(iii) Treatment of leukaemia
(d) Taral          ( )	(iv) heal wounds
(e) Tylophoine    ( )	(v) Blood pressure
(f) Morphine        ( )	(vi) inhibits cell division
(g) Vincristine    ( )	(vii) remedy for cancer
(h) Flavonoids     ( )	(viii) Relieve pain and relax muscular Contraction

- Name four plants which provide medicines.

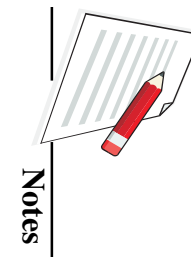
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- Where is CDRI located?

.....



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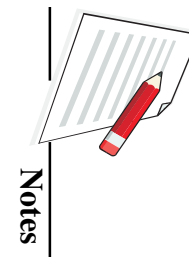

**Table 31.2 Some medicines obtained from plants**

S.No	Name of Plants	Name of the Drug Obtained	Part from which Obtained	Diseases for which may be used	Special Features and Distribution
1.	Sarpagandha ( <i>Rauolfia serpentina</i> )	“Reserpine”	Dried roots with intact bark from 3-4 years old plants	To reduce blood pressure; as a tranquilliser for mild anxiety patients	Erect shrub with whorled leaves found in almost all parts of India.
2.	Kunain “ Quinine” ( <i>Cinchona officinalis</i> )	Quinine	Bark of the tree	Malaria, Pneumonia, Amoebic dysentery and for eye lotions	In India, Cinchona is cultivated in Nilgiris, Sikkim, Assam and Bengal. Trees are propagated from cutting, bark of the trunk, branches and roots are removed from 6-8 year old trees.
3.	Pine , “ Chir” Scot pine ( <i>Pine sylvestris</i> )	Volatile oil consists of pinere	Purification of resin extracted from the stem	Chronic bronchitis and flatulent colic; as an ointment in rheumatic pains	Large trees with needle like leaves in clusters of trees found in the lower Himalayas and other hills of India
4.	Tylophora asmatica	Tylopherine	Leaves	Anti-inflammatory and anti-tumour properties. Specific remedy for asthma	Perennial twining, climber with lance shaped leaves, greenish flowers. Native to India
5.	Aloe vera	Aloin, Aloin emolin Aloection-B	Leaves	Get from the leaves heals wounds, emollient laxotive and useful for any skin condition that needs soothing	Native to America, cultivated as a pot plant.

6.	“Dhatura” ( <i>Datura stramonium</i> )	Alkaloid hyoscyamine	Leaves	Bronchitis and asthma; gives relief from pain in sudden muscular contractions of the body	Bushy plant with large leaves and white flowers grown in upper Himalayas and in hilly regions of central and southern India.
7.	Belladonna “ Angurshafa” Deadly Nightshade ( <i>Atropa belladona</i> )	Alkaloid hyoscyamine and atropine	Leaves	Relieves pain due to muscular contractions specially that of intestines also effective in whooping cough & asthma Atropine is used to dilate the pupil of the eye	Erect perennial herb with brownish-green leaves and yellowish brown flowers. Found in India only under cultivation
8.	Tulsi ( <i>Ocimum sanctum</i> )	Essential oil	Leaves	Bronchitis, Catarrh, cold and digestive complaints. Its oil is applied locally on ring worm and other skin diseases	Much branched, hairy, erect and scented herb.
9.	“Neem” Margosa tree. ( <i>Azadirachta indica</i> )	Azadirachtin	Leaves, bark fruit/seeds	For fever to break its periodic sequence; also useful in treating skin diseases.	Tree with pinnate leaves and green fruits
10.	Eucalyptus “Safeda” ( <i>Eucalyptus globulus</i> )	Essential oil contains eucalyptol and pinene	Leaves from which a pale yellow, spicy pungent oil is obtained	Used in the treatment of nose and throat disorders and fevers	Native to Australia commonly grown in all parts of India. Tall trees with whitish bark and long, blue green leaves.
11.	“Mahua” ( <i>Madhuca indica</i> )	Alkaloid and seponin	Flowers, seed oil	Used in the treatment of diseases of the respiratory system like cough & bronchitis	Large deciduous tree with large and thick leaves. Flowers small fleshy with brownish hairs. Grown in the plains and foot hills of India specially in Himalayas.

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12.	<i>Phyllanthus emblica</i> (Indian Gooseberry)	alkaloids and flavonoids	Leaf, flower and young shoot	Jaundice, Gonorrhoea, Diabetes and skin problems	All tropical and subtropical regions on earth small herb with pinnate leaves, flower arising below the mid rib
13.	<i>Catharanthus roseus</i> “Sadabahar”	Vinblastin, Vincristine	Leaves and stem	Treatment of leukaemia - a form of cancer	Annual and perennial herbs with simple opposite leaves and funnel shaped flowers that bear 5 stamens fused to the inside the tube. Madagasker, widely naturalized through out the tropics.
14.	“Aphim” opium ( <i>Papaver somniferum</i> )	Dried, brownish juice obtained from unripe fruits, contains morphine	Fruit	Used to relieve pain, induce sleep and relax muscular contractions.	Annual herb with large showy white flowers, cultivated extensively in India.
15.	Amla ‘Indian Gooseberry’ ( <i>Emblica officinalis</i> )	Used in drugs like “Chyavan Praash” and “Triphala”	Fruit	To treat constipation, diarrhoea, dysentery, enteric fever, indigestion and enlarged liver, anaemia, jaundice, cough, fungal infections, scurvy.	Tree with pinnate leaves; fruits fleshy, roundish indistinctly marked into 6 lobes, rich in vitamins C. plants occurs throughout plains and foothills. In India abundant in Madhya Pradesh
16.	<i>Taxus baccata</i> “yew”	Taxol	Leaves	Taxol inhibits cell division and is a very important anticancer drug.	Grows in northern temperate zones. Trees are 25 m height. Has rust red bark and dark green needle like leaves.



### WHAT YOU HAVE LEARNT

- Agriculture plays a major role in providing food, clothing and other human needs.
- The important food crops are cereals, millets, fruit crops, vegetable crops, pulses and oil seeds.
- Spectacular increase in the yield of crops, particularly cereals, through the application of modern techniques in agriculture is called Green Revolution.
- Modern agriculture requires special inputs of fertilizers, proper irrigation, crop protection against diseases and pests, breeding of disease resistant and high-yielding varieties.
- Proper storage and preservation of food is very important in order to avoid losses.
- A kitchen garden provides fresh vegetables all the year round.
- A forest is a large area of land with a lot of vegetation dominated by trees.
- There are four major kinds of forests – Rain forests, Tropical forests, Deciduous forests and Coniferous forests.
- Forest is an ecosystem with its community of organisms and the physical environment, in which the ultimate source of energy is the Sun.
- Forests improve the environment by removing large quantities of carbon dioxide from the atmosphere and by adding oxygen to it. They bring rains, prevent floods and cut down soil erosion.
- Forests support wildlife. Forests provide several commercial products such as wood and medicines.
- Rubber is an important yield of forest trees which are now being widely cultivated and further improved.
- Common drugs used to treat a variety of diseases are obtained from different parts of the common plants.



### TERMINAL QUESTIONS

1. What do you mean by the term “Green Revolution”? List the factors that helped to bring it about.
2. Explain the principle of farm management.
3. Which are the different methods of preserving fruits and vegetables?



Notes

**Notes**

4. How does food get spoiled?
5. Why is agriculture said to play a major role in providing important human needs?
6. Define a forest. What are the main types of forests?
7. How are forests helpful in maintaining proper environment?
8. List and classify the commercial products obtained from forests.
9. Which important drugs are obtained from lower plants?
10. Name the source of the following drugs:
  - (a) Reserpine
  - (b) Quinine
  - (c) Seponin
  - (d) Morphine

**ANSWER TO INTEXT QUESTIONS**

- 31.1**
1. Cultivated plants grown by man, wild plants grow themselves.
  2. Rabi crop
    - e.g. 1. Wheat
    2. Gram
 Kharif crop
    - e.g. 1. Maize
    2. Jowar
  3. 1. D      2. B      3. C      4. A
  4. 1. Cottonseed      2. Ground nut  
3. Mustard      4. Coconut
- 31.2**
1. (i) Triticum vulgare, cool weather with moderate rainfall, temperature 10-15°C  
(ii) Gossypium Sps. cloud free weather with 75 cm rainfall.
  2. Spectacular increase in the food/crop production specially cereals, using modern technique in called Green Revolution.
  3. details planning for growing high yielding crops and their storage
  4. (i) Food can be stored in airtight, water proof containers  
(ii) Special large sized godowns like silos.
  5. is a small garden next to house. advantage - adds beauty to the house, fresh vegetables are available at any time.



**Notes**

- 31.3** 1. (i) Forest as an ecosystem.
- (ii) Forest improves environment by cleaning air, and preventing soil erosion.
- (iii) Forest support wild life
- (iv) Forests provide commercial products
2. release oxygen prevent soil erosion holding moisture through root system and releases large quantities of water vapour through their leaves by the process of transpiration adding moisture for bringing rains.
3. Coniferous, Deciduous and Tropical rain forest.
- 31.4** 1. (a) (v) (b) (iv) (c) (i)
- (d) (vi) (e) (vii) (f) (viii)
- (g) (iii) (h) (ii)
2. (i) Sarpagandha (*Rauvolfia serpentina*)
- (ii) Quinine (*Cinchona officinalis*)
- (iii) Pine “Chir” (*Pine sylvestris*)
- (iv) Taxol (*Taxus baccata*)
3. Lucknow