



Crops, Food Management and Production

Contents of the Chapter

- 1.1 Introduction
- 1.2 Beginning of Agriculture
- 1.3 Agricultural Practices
- 1.4 Preparation of Soil
- 1.5 Adding Manure, Weed Control and Irrigation
- 1.6 Crops
- 1.7 Kinds of crops
- 1.8 Crop Security, Harvesting and Storage
- 1.9 Agricultural Development
- 1.10 Agricultural Implements
- 1.11 Dairy Farming/Industry
- 1.12 Poultry
- 1.13 Pisciculture
- 1.14 Apiculture
- 1.15 Care and Shelter of Animals
- 1.16 Protection from Diseases
- 1.17 Nitrogen Cycle

1.1 Introduction

Food is an indispensable need of man. Man has always made more effective and trustworthy efforts to gain food. Animals need food to gain energy so as to stay alive. Green plants prepare their food by the process of photosynthesis. But man and animals have to directly or indirectly depend on plants for their food. Thus, it is required by man to manage the food, prepared by plants, in such a way that there is enough food to satiate the hunger of an increasing population and none of it goes waste. Agriculture most probably began around 10,000 years ago in the Mesolithic age, when man discovered that by collecting the seeds of plants, lying on the ground,

and sowing them near his place, he could prepare a completely new plant to satisfy his needs.

In today's industrial world, the life of modern man is basically dependent on agriculture. Agriculture is the backbone of human existence. The three basic needs of life : food, shelter and clothing, besides many other needed things, are basically obtained from the world of plants.

For modern agriculture, a sequential plan is needed at every stage from preparing the soil to harvesting. Improvement is needed in plants for more crop production, which is prepared by different traditional plant reproduction methods.

1.2 Beginning of Agriculture

Ancient man was a wandering hunter who went from one place to another in the forests to search for food. He used to satisfy his hunger by eating flowers, leaves and fruits fallen from plants and hunting small animals. Slowly, he came to know that plants grow from the seeds scattered in the soil. This discovery led to the beginning of agriculture. The fact of man practising agriculture is made clear by the remains of Indus Valley Civilisation. This discovery completely changed the direction of human life. Now, man himself became the producer. Slowly, he made small agricultural implements of wood, stone and metal and engaged himself in satisfying the increasing demand for food. Along with agriculture, he also began to domesticate animals. From then till now, progress has been made in the fields of agriculture and animal husbandry.

1.3 Agricultural Practices

Agriculture is the second oldest occupation of man. Its discovery gave a new direction to his life and he became, leaving the life of hunter and food gatherer, a food producer. In the beginning,

agriculture was limited to places around large rivers, such as Nile in Egypt and Ganges in India. Later, he cut forests to expand agriculture region for the development of agriculture. Later, he also began animal husbandry, such as domesticating cattle and sheep. This way, farming transformed into agriculture.

Fast development of agriculture is needed for the development of any country. For enhanced crop production, best use should be made of the available land and modern practices of crop production should be adopted. A farmer has to complete different steps so as to grow crops successfully and to earn profit. These different steps which are used by the farmer to successfully grow the crops are called agricultural practices. Different steps of agricultural production are:

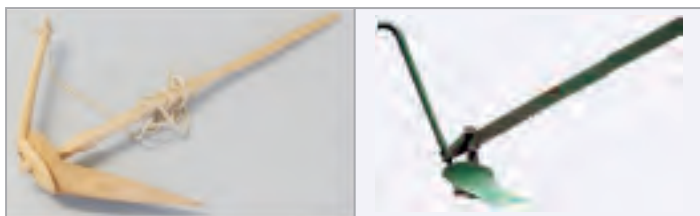
1. Preparation of soil
2. Selection of seeds
3. Sowing of seeds
4. Adding manures and fertilisers
5. Removal of weeds
6. Irrigation
7. Crop security
8. Harvesting, threshing (separating the grains) and winnowing
9. Storage

Interesting Fact

More than 30% of the world's land is used for farming and 5% land is used to graze domestic animals. Humans occupy only a small part of the land and the rest consists of forests, mountains, deserts and other non-fertile land.

1.4 Preparation of Soil

Processing of soil in such a way that it satisfies the needs of plants is called preparation of soil. First, the soil is ploughed and then turned and loosened. Roots easily go deep into the fine soil and can breathe easily. The process of loosening and turning of soil and making it fine is called tilling or ploughing. The



Wooden plough

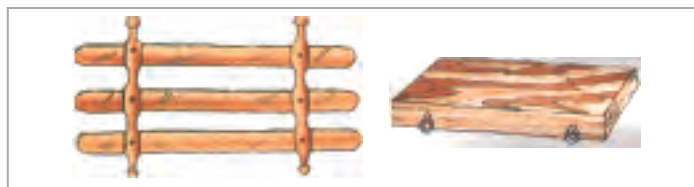
Iron plough

Two kinds of plough

soil is ploughed by a plough made of wood or iron. The plank of the plough sinks down into the soil, breaks it into fine particles and ploughs it. Large fields are ploughed by tractors while the small ones are ploughed by animals.

Ploughing of dry soil breaks it into large lumps which are broken by a plank. The plank consists of more than one flat wooden beam which are pulled over the soil lumps, either by bullocks or by a tractor.

The farmer stands on the plank and pushes it down. The ploughed land is levelled with the plank, so that it does not blow away with air or flow with water.



Two kinds of planks

Selection of Seed : Selection of seed is an important step of agriculture. The seeds should be mature, healthy and free of diseases; and must also be of that specific crop which is to be sown. So, only certified seeds should be sown.

Sowing of Seeds : The sowing of seeds is done by the following methods :

Broadcasting : Seeds should be sown in the soil either by hand or by a machine/seed drill. The seed drill is a long metal tube with finger like projection, which is connected to a funnel at the top. The seeds are filled into the funnel, which has many holes. The drill is tied to the plough and seeds are sown into the furrows made by the plough.



Simple method of sowing seeds



Seed-sowing machine (seed drill)

Transplantation : Some crops such as, paddy, tomato, brinjal and cabbage are first planted in the nurseries and seedlings are allowed to grow. After, the healthy and well developed plantlets are uprooted and planted in the main field. The process of transfer and replanting of seedlings into the main crop field from the nursery is called **transplantation**. For this, only the healthy seedlings are chosen to be grown further which increases the yield of crop.

Precautions during sowing and transplantation :

(i) Seeds and seedlings should not be planted close to each other, otherwise they would not get enough sunlight, water and nutrients.

(ii) Seeds and seedlings should also not be planted far from each other because a large space in the field will be wasted and the yield would be low.

(iii) Seeds should be sown at proper depth in the soil.

Interesting Fact

In developed countries, a tractor is used in place of horse or ox to pull all kinds of implements.

1.5 Adding Manure, Weed Control and Irrigation

The topsoil has a thick layer of humus. This layer is replete with nutrients such as nitrogen, phosphorus and potassium, which are beneficial and needed for the growth and development of plants. Being porous, this layer absorbs water and stores it for use in the dry months.

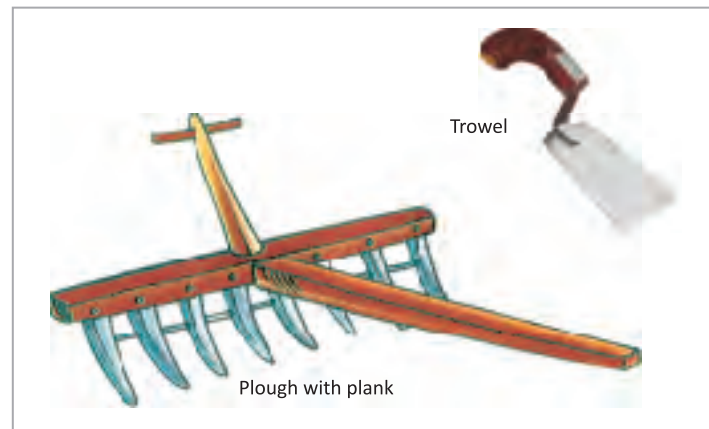
Every crop uses the nutrients present in the soil in appropriate quantity. The nutrients are replenished in the soil by adding manures and fertilisers to it.

Manures : Manures are made from the waste materials of animals such as dung, urine and waste materials of plants, and are full of nutrients like nitrogen, phosphorus and potassium. The farmer either uses the manure in the same form or changes it into compost before using it.

Vermi composting : For making compost, all the animal and plant waste materials are put into the pit and levelled and covered to protect the pit from air and sunlight, it is covered with soil and leaves. The micro organisms **ferment** and **decompose** this waste material and change it into simple substances which provide fine nutrition to the plants.

Fertilizers : Fertilizers are mixture of chemical compounds replete with nitrogen, phosphorus and potassium. They are made in factories and their maintenance and storage is easy. These are mixed in soil in appropriate quantities. They are absorbed directly by the plants. Too much usage of fertilizers is harmful for the plants and the soil. Thus, to increase crop production, there should be a proper coordination in the use of manures and fertilizers. Fertilizers replenish the shortage of nutrients in the manures.

Weed Control : Many undesired plants grow up with crop plants. These are called **weeds**. They compete with crop plants for water, sunlight and nutrients and reduce its yield. The removal of weed is called **weeding**. Weeding is done manually by hands, using small shovels, grub-hoe or with a plough. Some chemicals are also sprayed on crops, and are called **weedicides**. It stops the growth of many weeds but does not affect the main crop. Some main weedicides are 2, 4 – D (Dichlorophenoxy Acetic Acid), MCPA, metachlor, etc.



Plough with plank and trowel

Irrigation : All the processes needed for the life of the plant take place in the watery solution. The deficiency of water in soil is due to continuous evaporation and its percolation into the earth's depth. Hence, it is necessary that water is given to the plants from time to time. This process of watering the plants is called **irrigation**. The fields are irrigated by water from rivers, wells, reservoirs and tube wells.

The crop needs water at specific times. The water should be supplied when seeds or plantlets establish themselves in the fields. The grain crop needs to be irrigated at the time of sowing, flowering and the formation of the grain.



Irrigation by tube well



Irrigation by Persian wheel



Irrigation by bed method

Different forms of irrigation

All the fields need water in proper quantity, neither very much and nor very less. More of water can destroy the crops. Continuous flowing of water increases the amount of salt in the soil which destroys the crop permanently. The extra water should be taken out through proper discharge. Some plants such as paddy (rice) need to be partially immersed in water and it is irrigated by **bed method**.

1.6 Crops

When one kind of plants are grown on a large scale, it is called **crop**. For example, the meaning of wheat crop is that all the plants grown in a field are of wheat. For a good crop yield, it is necessary that ploughing, sowing, irrigation, etc. are carried out at correct times. Manure, water and sunlight are needed more for the growth of crops.

1.7 Kinds of Crops

On the basis of diversity, crops can be of many

kinds, such as grains, vegetables and fruits. Based on the season they are grown in, the crops are classified in the following ways :

1. Rabi Crops : The crops which are grown in the winter season are called **rabi crops**. In India, the winter season is generally from November to February. Hence, this time is suitable for rabi crop. Some examples of rabi crops are wheat, gram, peas, mustard and linseed. Besides, at many places, pulses and vegetables are grown in summer, which is the best season for them.

2. Kharif crops : The crops which are sown in the rainy season are called **kharif crops**. Rainy season in India is generally from June till September, hence it is suitable for growing kharif crops. Paddy, maize, soya bean, groundnut, cotton, etc. are examples of kharif crops.

These crops along with nutrients obtained from them and examples are given in the following table :

S.N.	Name of Crop	Example	Nutrient
1.	Cereal or grainy crops	Paddy, wheat, maize, etc.	Carbohydrates, vitamins, minerals
2.	Oilseeds	Mustard, sunflower, soya bean, etc.	Protein, fat
3.	Pulses	Gram, peas, etc.	Protein
4.	Root crops	Radish, sweet potato	Carbohydrates, minerals
5.	Bulbous crops	Potato, tapicoa	Carbohydrates, minerals
6.	Sugar Crops	Sugar cane, sugar beet	Carbohydrates, minerals
7.	Plantation crops	Coffee, tea, coconut, rubber	Anti-oxidant (tea), minerals and fat (coconut)
8.	Fibrous crops	Jute and cotton	These are not food crops

1.8 Crop Security, Harvesting and Storage

Crop Security : Crops need security from birds and insects, especially at the time of grain formation. For this, the farmer has to look after the crops everyday. To prevent the birds from eating the grains, they may be scared by a **scarecrow**. A scarecrow is a human effigy which is put up in the fields. Insects and rodents (mice and rabbits) are the main crop destroyers. Mice eat the grains and destroy the roots. Insects eat the leaves, even in larva stage. Bacteria, virus and fungi develop diseases in plants such as rust and *kand* in wheat and *jhulsa* disease in paddy.



Scarecrow

The chemicals used to kill pests are called **pesticides**. These are those chemicals which kill the pests, along with their eggs and larva, but do not hurt the plants. Most pesticides are insecticides only such as, B.H.C., D.D.T., malathion, parathion, etc. The insecticides are sprayed only for a specific time in the life cycle of the pests.



Farmer spraying pesticide

Pesticides also cause some harm. They kill some useful organisms too, such as earthworms and also pollute the environment. Finally, they reach the human body and cause harm. There is a layer of pesticides on cereal grains, fruits and vegetables. Hence, they should be washed properly before eating.

Harvesting : Collecting the ripened crop in the field itself is called **harvesting**. India has two main crops :

(i) Kharif crops and (ii) Rabi crops

Kharif crops are sown at the time of beginning of south-west monsoon (June to July) as these crops require more water, such as paddy. Kharif crops are harvested at the end of the rainy season, in September or October.

Rabi crops are sown in the beginning of winter (October to December) and harvested in March or April. Wheat is a rabi crop while paddy (rice) is a kharif crop but it can also be grown as a rabi crop in well irrigated regions.

The crops are harvested with **sickles** or in large farms, with **mechanical harvesters**.



Farmer cutting crop by a sickle



Mechanical harvester

Threshing : The harvested crop also has chaff along with the grains. Separation of the food grains from the chaff is called **threshing**. Earlier, it was done by animals but today, it is done by machines. Such machines



Thresher

are called **threshers**. Harvesting and threshing, both are done by a motor-driven machine called **combine**. This machine is used at huge farms.

Winnowing : The mixture of grains and chaff is separated by winnowing. The mixture is made to fall from a height. As the grains are heavier, they fall directly on the ground and form a heap while the chaff, being lighter, is blown away by air a slight distance away. This way, the earth's gravity and material's density help in the process of winnowing.



Winnowing

Storage of Crop : Grains are dried in the sun and stored away from moisture. These days, grains are weighed, filled in sacks and brought to godowns. The grains are protected from insects, rodents and moisture. Enough quantity of insect repellents are mixed with the grains at the time of storage.

1.9 Agricultural Development

India's crop production in 1951 was 4.5 crore tons which increased to 19.6 crore tons in 2001. This increase of 15.1 crore tons in the crop has the following reasons :

(i) Hybridization : Any plant species has many breeds. All the required qualities are not found in any one breed only. Some breed may be **strong** and hardy (more resistant to diseases and insects) while the other may give a **better yield**. Cross-breeding or hybridization of both the breeds provides a breed which has both of these qualities. The fertilization of the ovaries of the plant of one breed with the pollen grains of the other breed is called **hybridization**. The reproduction of two different species, in which each has some required qualities, is called **hybridization**. The new breed so produced is called **hybrid** and it has both kinds of qualities.

The Indian Agricultural Research Institute, Pusa, New Delhi has developed advanced breeds of wheat, rice and different vegetables. Some such breeds with high yield are as follows :

Wheat : Sonalika, Kalyan, Sona, Sarvati Sonora, Heera, Moti.

Rice : Jaya, Padma, I.R.8

Brinjal : Pusa Kranti, Pusa Purple.

Interesting Fact

Sprinkler Irrigation was used for the first time in Haryana, Rajasthan and Madhya Pradesh.

(ii) Soil Improvement : Continuous growing of one crop drastically reduces the quantity of some specific nutrients in the soil, thus reducing the yield. To replenish the nutrients in the soil, manures and fertilisers, specially fortified with nitrogen (N), phosphorus (P) and potassium (K) are mixed with it. Such fertilizers are called NPK fertilizers.

(iii) Protection from Pests and Weeds : Pesticides such as malathion, disystone and B.H.C. are sprayed to control such pests which destroy the crops or eat them. Because most of the chemicals cannot differentiate between useful and harmful insects and have opposite effects, hence genetic control over pests is more effective. The male population is attracted towards such a trap which has some quantity of female hormones.

Weeds compete with the plants for nutrients. Special chemicals called **weedicides**, are used to prevent their growth. Two main weedicides are 2, 4-D and metachlor.

(iv) Control Over Plant Diseases : Fungi, bacteria and virus infect plants with diseases. Insects act as their carriers. For example, **rust** in wheat and **disease** in potatoes are **fungal diseases**. The **disease** in rice is a bacterial disease whereas potato mosaic is a **viral disease**. Some of these diseases are spread by seeds while the rest spread from soil and air. Fungicides are used against fungal diseases. Some main fungicides are agrosan, bondo mixture, M-45, dithane - 79, etc. Antibiotic streptomycin is used against bacterial diseases.

(v) Better Storage : To protect the food grains kept in godowns, these are made of cement with roofs made of galvanized iron sheets. Rainwater cannot seep through its walls, floor or the roof. Birds and rodents too cannot enter such godowns. Insects are kept away from the godowns by spraying repellents, smoke or pesticides such as malathion. At homes, well-dried grains are kept in airtight drums, made of aluminium or galvanized iron, along with insect repellents.

1.10 Agricultural Implements

For a good yield, the soil has to be made porous and loose before sowing. This work is done by many implements. Some such main implements used in this work are a plough, hoe, cultivator, harrow, dibbler, etc.

1. Plough : Ploughs are of many kinds. Some of its main types are :

(i) Indigenous Plough : It is a very simple plough. It scratches the earth up to a depth of 7.5 cm to 10 cm and makes a furrow 5 cm to 7.5 cm wide. It has the following parts:

(a) Haris (b) Parodha Patha (c) Ploughshare (d) Handle (e) Pachasa (f) Harit or gokhal (g) Chhad



Indigenous plough

(ii) Meston Plough : It is a progressive plough. In the present time, it is used extensively. It makes a furrow from 12.5 cm to 17.5 cm wide and 10 cm to 12.5 cm deep. A mold board is attached to it and it performs the work of turning the soil. It shifts the lower soil up and the upper soil below.

Besides the meston plough, some other ploughs are victory plough, monsoon plough, turn rest plough and stonebreaker plough.



Meston plough

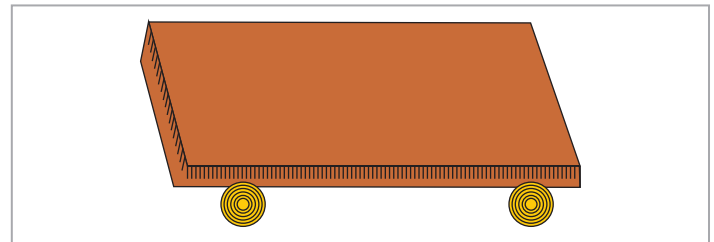
2. Hoe : It is a simple tool which is used to remove the weeds and to make the soil porous. It has a long beam of wood or iron which has a strong, broad and



Hoe

bent plate of iron which works as a blade. Its other end is pulled by animals.

3. Plank : The plank is made of a wooden board which has hooks at both the ends. In agriculture, the plank is used to make the land porous, to make the land plane and to cover the broadcasted seeds. It also helps to retain the moisture in the soil.



Plank

4. Berber : This implement has an iron strip of 50 cm – 65 cm width. It is used to make the high and low land even, to make the soil porous, to turn hard soil and to cut grass.

5. Cultivator : These days, ploughing is done by a tractor operated cultivator. It saves both time and labour.



Tractor driven cultivator

Interesting Fact

Drip irrigation system was promoted in Maharashtra, Karnataka, Odisha, Andhra Pradesh and Tamil Nadu for the cultivation of fruit crops.

1.11 Dairy Farming/Industry

The dairy farming/industry in India began in a planned manner in 1965 with the establishment of **National Dairy Development Board** at Anand (Gujarat). In 1970, the board launched a project named **Operation Flood** in which a cooperative and self sustaining national dairy industry was set up. Indian dairy has made huge progress in the last 30 years, because of which India has become one of the largest milk producing countries in the world. As a result, the import of solid milk, milk powder, butter, ghee and oil has ceased completely. At present, India is exporting thousands of tonnes of milk powder to its neighbouring countries.

Milk Producing Animals : The main milk producing animals of India are cow, buffalo, goat and camel. Goat's milk is nutritious and in some regions, it is preferred over cow's milk. As compared to cow's milk, buffalo's milk has more of fatty elements. Buffalo are the main source of milk in our country.

Cows : There are three breeds of dairy cows in India:

(i) Indian or indigenous breeds, main among which are Red Sindhi, Sahiwal and Gir.

(ii) Imported breeds of cows which include Jersey, Holstein, Fresian and Brown Swiss breeds. Fresian cows give most milk but have less of butter fat. The milk of Jersey cows is thicker.

(iii) Among the advanced or hybrid breeds are Karan Swiss, Karan Fries and Freswal breeds. The production of milk has gone up by two to three times with the inclusion of new hybrid cows as compared to the indigenous cows.

Buffalo : Buffaloes are reared in large numbers in India. There are nearly ten breeds of buffaloes in India, main among which are Murra, Mehsana and Surti.

Fodder for Dairy Animals : Besides the removal or retrenchment of non-producing animals, the proper arrangement of adequate fodder for milk producing animals is also required.

Animal fodder includes grass, dry fodder (chaff), and legumes such as clover and alfa. Fodder is of mainly two kinds :

- (i) Roughage (Thick fodder) : mainly green fodder.
- (ii) Concentrated fodder, i.e. cereals and millets. Oil cake made of mustard and cotton seeds is also mixed with fodder to make it better.

Diseases in Dairy Animals : Cows and buffaloes are afflicted by various diseases. These diseases can be divided into two groups : parasite-borne diseases and infectious diseases.

Parasite-borne Diseases : Outer parasites such as flies, lice, etc. live on the skin of cows and buffaloes and give rise to skin diseases. Leech sucks buffalo's blood and produces anemia disease. Some internal parasites such as worms affect the stomach and intestines of cows and buffaloes.

Infectious Diseases : Such diseases are mainly spread by microorganisms such as virus and bacteria. These are transmissible diseases and spread from animal to animal on contact. Some viral diseases are foot and mouth disease, cow pox or vaccinia, blue tongue and rinderpest. Some bacterial diseases are anthrax, black quarter and mastitis.

Symptoms of Animal Diseases : In foot and mouth disease, boils break out on the hooves and mouths of animals. High fever and shivering afflicts them. The animals, just like humans, become weak, lethargic and inactive. Their eyes begin to water and they begin to drool.

1.12 Poultry

Rearing of hen and other domestic birds is called poultry. The birds which are generally reared are ducks, geese and turkey.

The male and the female bird are different in looks and behaviour.

Feed of Poultry Birds : The prevalent feed of poultry birds are grains and moist mixture or meshed feed. In thier feed, these birds require small stones or pebbles, which they need to mesh their feed. Some stones or calcium carbonate found in grains are used to make shells of eggs. Hens need water in very large quantity. If they do not drink more of water, they lay less number of eggs.



Poultry farm

Laying of Eggs : Hens begin laying eggs from the age of six months. The egg laying hens are called *adhyasan* hens. The breeds which lay more eggs are Rhode Island Red, Black Minorca and H.H.260. It is named so because a bird of this breed can lay up to 260 eggs within a year of beginning to do so. The shell of the egg is made of calcium carbonate. Inside the shell is a white part called **albumin**. In the centre of the albumin is a yellow part called **yolk**.

Test of Eggs : The quality of eggs can be tested by the following ways :

(i) Keep the egg in front of a light source. The materials inside shift to one side and the egg may look transparent. If it is so, then the egg is infertile. On the other hand, if a dark coloured round body is present in the middle, then the egg is fertilized.

(ii) Keep the egg in hot water. If it floats, then the egg is bad but if it settles at the bottom, then it is a good egg.

Disease Affecting Poultry Birds : Cholera and chicken pox causing virus infect poultry birds. **Roundworm** cause disease in the digestive system. *killi* and *chinchdi* too affect the birds.

1.13 Pisciculture

Production of fish is called **pisciculture**. Most protein is found in fish. In India, fish are found in ponds, rivers, seas, etc.

Edible Fish : Such fish are mainly divided into two main divisions : Sea fish and freshwater fish.

Sea Fish : Bombay Duck, Eel, Salmon fish are the main ones.

Freshwater Fish : Main fish are Singhi, Malli.

Culturing of fish : Growing and developing of small fish into large ones in specially made ponds, is called **culturing of fish**.

To breed freshwater fish, their eggs are put in nurseries called *hatcheries*. After the fish hatch out of eggs, they are fed and well looked after. Later, when the fish grow bigger, they are made to reproduce. This is called **indigenous pisciculture**.

1.14 Apiculture

Apiculture is the main source of production of honey and wax. Bees can be tamed easily as their nature is very friendly. Like all insects, it has two pairs of wings and three pairs of legs. Bees live together as a group which is called **hive**. Generally, beehives can be seen hanging on trees, tall buildings and water

tanks. Since, the bees are reared in a box, their activities are limited to it only.

Lifecycle of a Bee : The whole lifecycle of a bee is completed in four steps– egg, larva, pupa and adult. The queen bee lays eggs in every hole or cell of the hive. After three days, the larva comes out of the egg. Six days later, it changes into a pupa. The pupa takes nearly seven days to change into an adult bee.

On the basis of work, the adults are of three types :

- (i) Queen
- (ii) Male insect
- (iii) Worker bee



Queen

Male insect

Worker bee

Honey : Honeybees make honey from the nectar of flowers. The honey is extracted out of the cells and collected in air-tight bottles.

To test the purity of honey : Take a water filled tumbler. Now, put some drops of honey into it. If the honeydrops maintain a current in the water, it is pure. Impure honey completely dissolves in the water.

1.15 Care and Shelter of Animals

Some animals such as, cow and buffaloes, if well looked after, remain healthy and keep on providing milk for a long time.

The hair of cows and buffaloes should be combed from time to time, so that broken hair and dust are removed. These animals are kept in sheds with roofs so as to protect them from cold, heat, sunshine, etc. The roofs of sheds should be sloped so that a thorough ventilation is maintained.

1.16 Protection from Diseases

To protect the animals from diseases, the following ways may be adopted :

- (i) Animals should be kept in better shelters. Diseases will be less.
- (ii) Animals should be bathed regularly.
- (iii) Animals should be fed with nutritious fodder.
- (iv) Sick animals should be kept separate.

- (v) Fungicides should be used regularly.
- (vi) Animals should be inoculated with disease resistors.

1.17 Nitrogen Cycle

Before studying nitrogen cycle, we shall know about nitrogen fixation.

Fixation of Nitrogen : In this process, nitrogenous compounds are made from the nitrogen present in the atmosphere. This is called **nitrogen fixation**. It has two factors.

1. Bacteria : Bacteria take nitrogen directly from the air without any hindrance and change it into compounds. These compounds are used by plants to obtain proper and suitable nutrients. These compounds provide food to the plants. Generally, these bacteria are found in the form of knots in roots of beans, peas and groundnuts.

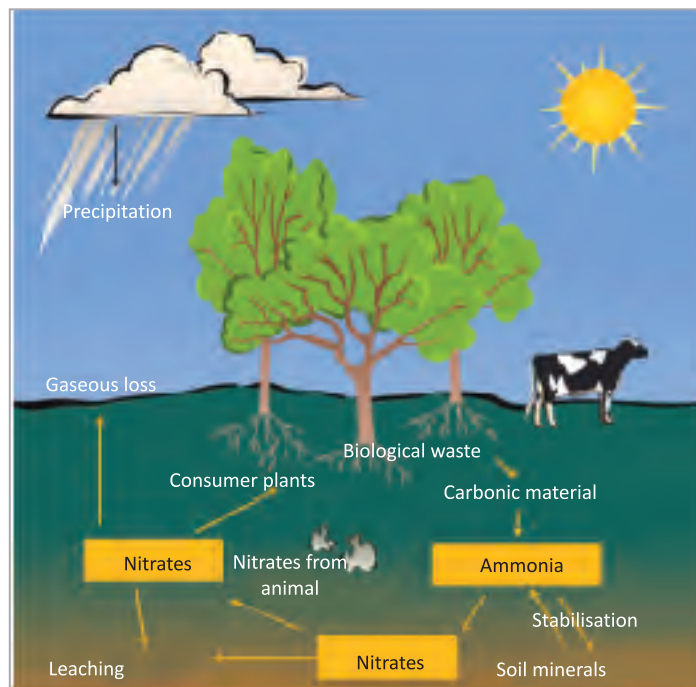
2. Blue-green Algae : To make nitrogenous compounds, the blue-green algae remove nitrogen from the air and it combines with different materials.

Nitrogen Cycle : Plants get nitrogen from the compounds present in the soil. The compounds get nitrogen from the air or from manures made from waste materials. The animals get nitrogen by eating plants.

Hence, nitrogen reaches plants and animals from soil and reaches there once again.

This movements or cycle of nitrogen maintains the balance in the nature. This process is called **nitrogen cycle**.

Animals inhale nitrogen but it is not absorbed by the lungs and is exhaled out by breathing only.



Nitrogen cycle

Highlights

- Food is an indispensable need of man.
- Humans and animals are directly or indirectly dependent on plants for their food.
- Ancient man was a wandering hunter.
- Agriculture is the second oldest occupation of man.
- Discovery of agriculture gave a new direction to human life.
- That is why man came to be called a producer.
- The steps of agriculture are preparing the soil, selection of seeds, sowing of seeds, adding manure, removal of weeds, irrigation and crop security.
- The growth of plants on a large scale is called crop.
- Crops are of two kinds – rabi and kharif.
- Crops are stored after harvesting.
- Ploughs are of two kinds : wooden plough and iron plough.
- Better quality seeds should be used for sowing.
- Crops are improved by hybridization and better soil.
- Pesticides are used to protect the crop from insects.
- Milk is produced by dairy farming.
- Hens are well looked after in poultry farming.
- Fish are of two kinds : sea fish and freshwater fish.
- In apiculture, the bees are reared in a box.
- It takes nearly 15 days for an adult honeybee to grow.
- Nitrogen cycle maintains the balance in nature.

Exercise



A. Tick (✓) the correct options :

1. What was ancient man dependent on for food?
(a) Water (b) Fire (c) Leaves of plants (d) All of these
2. What is the beginning period of agriculture known as?
(a) Ancient age (b) Middle age (c) Present age (d) Mesolithic age
3. What is the process of separating grains called?
(a) Irrigation (b) Sowing (c) Storage (d) Threshing
4. Ploughs are of how many kinds?
(a) 1 (b) 2 (c) 3 (d) 4
5. What is the removal of seeds called?
(a) Harvesting (b) Winnowing (c) Weeding (d) None of these
6. Tomatoes are sown in:
(a) fields (b) open ground (c) transplantation (d) nursery
7. Paddy is:
(a) good crop (b) kharif crop (c) plant crop (d) All of these
8. It is mixed during storage.
(a) Water (b) Soil (c) Chaff (d) Repellent
9. It is a species of brinjal.
(a) Jaya (b) Padma (c) Pusa Purple (d) All of these
10. It is a freshwater fish.
(a) Hilsa (b) Eel (c) Mali (d) All of these

B. Fill in the blanks :

1. Agriculture is the _____ of human existence.
2. Sowing of seeds by hands is called _____.
3. The seeds should be _____ in land by hands.
4. Topsoil has a _____ layer of _____.
5. _____ plants are called weeds.
6. Holstein is a kind of _____.
7. Concentrated fodder is called _____.
8. Hoe makes the soil _____.
9. Plank helps to stop _____ of _____.
10. The use of cultivator saves both _____ and _____.

C. Very Short Answer Questions :

1. Mention one work of Meston plough.

2. Write the name of one kind of wheat crop.
3. Crops are of how many kinds?
4. How much was India's agricultural production in 1951?
5. What is a scarecrow used for?
6. Till how much depth does a normal plough scratch the soil?
7. Fish are classified into how many groups?
8. Nitrogen fixation is done in how many divisions?
9. In how much time do the hens begin to lay eggs?
10. What should be done with sick animals?

D. Short Answer Questions :

1. Write three basic needs of life.
2. Write any three ways of agriculture.
3. Define manure.
4. Write some sources of irrigation.
5. Write the name of oil crop and which nutrient do we get from it?
6. Define hybridization.
7. Write the names of main ploughs.
8. How can soil fertility be increased.
9. What is poultry farming?
10. How is honey tested for purity?

E. Long Answer Question :

1. How is soil prepared?
2. Explain agricultural practices.
3. Write a short note on weeds and irrigation.
4. Explain crop and its kinds in your own words.
5. Which efforts can be done to improve crops?
6. Explain agricultural implements in detail.
7. Write a note on dairy farming and pisciculture.
8. Explain nitrogen cycle with a diagram.
9. Write a brief comment on agriculture.
10. How can crops be protected against pests and weeds?



Project Work

- Make a chart on adding manure, irrigation, harvesting, preparing soils and sowing. Put in up in your class.