



12

ADVANCEMENT IN FOOD PRODUCTION

It was summer vacation in schools, Ashok was going to his grandfather's village with his mother. Seeing the crowds in the station and the train, he all of a sudden got the idea that how much food should be needed by this crowd and he asked the same question to his mother. Mother said that you see this kind of crowd at the office, hospital or other public places also. And this is a glimpse of our growing population, in front of which food supply is a fundamental problem.

Food is one of the requirements of human beings, because we can live without less clothes and home, but cannot live without food. Roti is the first of the three basic requirements of man—food, cloth and house. Let us consider the solution of the food problem in this lesson. For this, we will read more and more food production methods and new techniques.



OBJECTIVES

After reading this lesson you will be able to:

- Understand new technologies of food production;



- To know the irrigation and the means of irrigation;
- To differentiate between Green Revolution and White Revolution;
- knowing the use of compost and fertilizers;
- Understand the storage of food;
- And getting to know soil management.

12.1 FOOD PRODUCTION

Due to the increasing population, we can solve the problem of food supply in two ways.

1. The land used for farming should be increased. But you will know that the size of land is limited.
2. By adopting scientific and new technology, food grains production can be increased per unit area. That is, through intensive farming, more yield can be obtained.

All of us living beings depend on plants for food, because we cannot prepare our own food. Whereas, plants make their food with the help of water and soil in the presence of sunlight. Our population is increasing at a much faster rate than plants. Therefore, there is a need to adopt new technologies in agriculture for food supply.

In the 1960s, there was a lot of loss of life and property due to famine and starvation in our country. To get rid of this, we improved agricultural practices and used new breeds of crops. This increased our crop production and we were able to meet our requirements.



New technology for food production

As man became more knowledgeable about farming, the methods of farming continued to improve. According to the results obtained as a result of research on various agricultural practices of farming, those techniques started to be adopted. Let's see what these techniques are?

1. **Preparation of soil:** Preparation of soil means that the field should be plowed according to the crop, which makes the soil friable. In friable soil, as the growth of roots is sufficient then the need of water also increases. Roots can take water and air easily. After plowing, they level the field.
2. **Sowing:** After the selection of good and healthy seed, they sow it in the field prepared. Seed treatment is done before sowing, so that there is no loss of crops.
3. **Irrigation:** The crop should be irrigated at the given time. Appropriate amount of water should be applied for irrigation. If there is too much water, then the drainage of water should also be managed.
4. **Weeding-hoeing:** When the crop starts to grow, then along with the crop, unwanted plants also grow together which are called weeds. These weeds should be removed with the help of workers or by using chemicals, or else they harm crops. Crops are also damaged by insect flies and diseases, we control them by using chemicals.
5. **Manure-Fertilizer:** Plants take their nutrients from the soil. Sometimes Nutrients taken by the plant such as nitrogen,



phosphorus and potash content is low in soil. Therefore, we supply them by adding manure or fertilizer to the field. Manure is rotten dung, etc. and fertilizers are chemical substances.

- 6. Harvesting:** At a certain time the crop is ripe and ready. This is called sickle or tractor driven machine, which harvests the crops standing in the fields and also helps mowing the field. With the help of combine, they harvest and bring them to the barn. After that, we thresh and clean and store it.

Based on the above techniques, a number of experiments were conducted through which successful harvesting can be done, some of them are described below.

What is the Green Revolution

In the 1960s, the slogan of the Green Revolution came. The country was struggling with severe food shortage. Special attention was paid to farming, so that fast and high quantities with quality of food grains can be produced.

New species of crops developed as a result of agricultural research. The use of which increased the yield and solved our food supply problem. These advanced species have many qualities such as:

1. They are ready soon.
2. Their production capacity increases with the use of manures and fertilizers.
3. Many species are also anti-disease.
4. Production price per unit is low.
5. Gives higher yield.



Our granary is filled with the use of these advanced species. Today we also export food to other countries. All of this has been possible only through the use of innovative species and new methods of agriculture. This entire process is known as the Green Revolution. Do you know who gets the credit for bringing the green revolution in our country? To M/s. Swaminathan. M/s. Swaminathan worked to revolutionize agriculture and developed many new high yielding improved varieties.

Ashok reached his grandfather's village. Everyone met with great love. After his first day, Ashok had a great desire to go to the fields and see farming with his eyes. He asked so many things from his Grandfather. Grandfather gave a lot of information, some of which are as follows:

1. Climate
 - (i) Temperature
 - (ii) Rain
 - (iii) Moisture
2. Soil
 - (i) Varieties of soil
 - (ii) Nutrient content in soil
3. Management
 - (i) Availability of manure and fertilizer
 - (ii) Use of weeds and pesticides
 - (iii) Availability of skilled workers
4. Others
 - (i) Market (place of sale)
 - (ii) Storage
 - (iii) Vehicle tools



Then Grandfather told further, in addition to all these, good food production depends on the intellectual capacity of the farmer and the tools used, i.e. mechanical agriculture. Ashok asked what is this mechanical agriculture?

Mechanical Agriculture

Farming was initially taken into consideration as far as the development of pasture was concerned, because fodder for animals was the main objective of those people at that time. But as man got the knowledge of farming he started using new tools in farming.

Sl. no.	Agricultural activities	Various agricultural equipments used in farming	
		In old-time	In modern times
1.	Plowing	Domestic plough (wood)	tractors, modern plough made of iron
2.	Sowing	Behind plough or by spill method	seed drill
3.	Manure	Sprinkler Method equipment or foliar spraying	Machine driven
4.	Irrigation	Wells, pond	Pumps and drip irrigation
5.	Weeds	Plucking by hand biological control	Pesticides and by
6.	Plant safety	Use of various chemicals from handheld devices	Spraying of insecticides with machine-operated equipment



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|-----|----------------|--|--|
| 7. | Weeding-hoeing | Trowel and Shovel cultivator (Bullock or tractor driven) | By hand or equipment with which weeding - hoeing is done) |
| 8. | Harvesting | such as sickle equipment from | Machine driven which harvesting and mowing is done |
| 9. | Threshing | with the help of hand or bullock | Machine driven equipment or threshing machine which separates grain from crops |
| 10. | Storage | In containers made of jute bags or clay | In containers made of steel or cement |

Ashok went to the farm the next morning, saw the workers irrigating the fields. Ashok asked Grandfather what are the best means of irrigation?

Irrigation

Plants use water for the preparation of their food. Providing water to plants (crops) by various means is called irrigation. A lot of nutritional elements reach different parts of the plant through water.

Irrigation should be done at the appropriate time and in appropriate quantity. If there is no water at the right time, the crop production is affected. Over-watering can also result in crop damage. The following things should be kept in mind while irrigating the plants:



- Irrigation should be done at the right time.
- Appropriate irrigation should be done.
- There should be proper management of drainage.
- Water should be saved from going waste.
- Water storage should be arranged during the rainy season.
- Fertilization of fields should be done before irrigation.

Means of irrigation:

The following means are commonly used for irrigation:

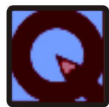
(i) canal (ii) well (iii) pond (iv) pump (v) tubewell (vi) drip irrigation



ACTIVITY 12.1

What you need to do: Separating healthy seeds from mixed seeds.

How to do it: If there are unhealthy seeds in the paddy seeds, then put them in a big vessel or a tub to separate them. Add clean water to the tub and mix all the seed with the help of some wood. After one hour you will see that the unhealthy seeds are found on the upper surface of water while healthy seeds are on the surface of the vessel. In this way, healthy seeds are used by separating unhealthy seeds from them.



INTEXT QUESTIONS 12.1

1. Match Section 'A' with Section 'B' :

Section 'A'	Section 'B'
(i) Food grains	(a) Improved seeds
(ii) Green revolution	(b) Canal
(iii) Mechanical farming	(C) Combine
(iv) Irrigation	(d) Pulses
(v) Harvesting	(e) Tractors

While returning from the farm, Ashok had a dilemma in his mind, what are manures and fertilizers. Before sleeping at night, he asked Grandfather, what is the difference between manure and fertilizer?

12.2 MANURES AND FERTILIZERS

The main purpose of providing manure and fertilizer to plants is to provide nutrients. Therefore, the element lacking in plants can be met through fertilizers. This enhances plant growth and provides more benefits.

The difference between fertilizer and fertilizer is as follows -



Notes



Manure

1. Manure is a natural substance, with the use of which increases the amount of fossil in the farm and increases fertility. For example dung manure, compost, etc.
2. It contains less amount of nutrients.
3. Provides nutrients gradually to plants.
4. Manure is always used before sowing seeds in the field.
5. Manure do not leave any harmful effects in plants or soil.
6. Its production is simple.
7. They are less expensive.

Fertilizer

1. Man-made materials, which increase nutrient use in fields. For example, urea.
2. It contains a high amount of nutrients comparatively.
3. Nutrients are available to the plants quickly.
4. Fertilizers can be used in different stages of crop growth.
5. If fertilizers are not used in a proper way, they can have adverse effects on the soil.
6. It requires a special kind of efficiency in its production. Often they are produced in the factory.
7. They are expensive.

Ashok continued the discussion and asked how fertilizers can be used judiciously?



Use of Fertilizers judiciously

1. The amount of nutrients in the soil can be reduced, which we can supply by adding manure or fertilizer in the fields.
2. Soil should be examined before use of fertilizer.
3. Fertilizer should be used only as per the requirement of crops.
4. Determine the amount of fertilizer needed based on the moisture available in the soil.
5. Fertilizer should be used in areas with high rainfall.
6. Nutrients of crops are obtained by providing fertilizer in the form of slurry
7. Use of fertilizer also depends on the method of cultivation.
8. Before use of fertilizer, the field should be bunded or else the nutrients get released.

Generally the following fertilizers are available in the market:

1. Urea
2. Super Phosphate (Single)
3. Super Phosphate (Double)
4. Muriate of Potash
5. Dye-Ammonium Phosphate
6. Nitrophosphate (Sufla)
7. IFFCO N.P.K. (Grade-1)



While Ashok was discussing manure and fertilizer with his grandfather suddenly a grasshopper came and sat on Ashok's shoulder. Ashok panics but Grandfather removes the grasshopper and says that these moths damage the crops. Ashok asked, How do we prevent pests that harm crops?



ACTIVITY 12.2

Find out the various fertilizers available in the market and prepare a list.

Pests and Pesticides

The major pests in crops and their prevention are as follows:

1. **Termites:** It is very harmful and keeps tunneling in the ground. It keeps on eating the roots of the plants. For its prevention Aldrin should be used.
2. **Grasshopper:** It damages the plant by eating the leaf. To prevent this, BHC (Tbh) should be used.
3. **Paddy gandhi bug:** They suck the juice from the leaves of paddy, because of which paddy does not form any grain. To prevent this, Chhatra should be used.
4. **Sundi:** Sundi is approximately 4 cm long. It eats leaves, which reduces production. For its prevention Endosulfan should be used.
5. **Insect:** It damages food grains at the time of pest storage. Sulfas are used to control this.



Then Ashok asked again, what is the difference between insecticide and herbicide?

Grandfather said that weeds are unwanted plants that grow in a place without sowing. Especially weeds, insect moths and animal birds cause damage in crop production. Weeds are controlled by using various chemicals. These chemicals are called herbicides. Herbicides sometimes destroy the weeds completely, such as (2, 4) herbicides.

The chemicals used to control insect moths are called insecticides, like BHC. e.t.c.

Ashok asked how do we store food?

Food grains storage

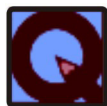
Grandfather said with a smile that the crops that survive the effects of harmful pests, those crops are harvested when they are ripe or ready. Harvesting of the crop should be done at the right time, otherwise there is loss of food grains as the grains begin to fall. Harvesting is usually done with sickle but in modern agriculture many places have started harvesting with Combine harvester. Through which harvesting work is completed quickly.

After harvesting the crops are threshed. For threshing, they take the help of cattle, tractors or oxen. By threshing, the grains are separated from the crops. If the moisture content in the grains remains around 10 percent, then you can store them in jute bags. If there is moisture in the grains, then by drying it brings moisture level up to 10 percent. Storage is done in ceramics or steel vessels.



Notes

These vessels are cleaned thoroughly before storage. When needed, through chemicals, these parts are processed with chemicals. Aluminum phosphate should be used to protect stored food grains from mice etc.



INTEXT QUESTIONS 12.2

Fill in the blanks

1. Compost is a type of
2. Urea is a type of
3. The Sundi can be controlled using
4. Insect comes at the time of
5. The moisture in the grain should be percent before storage.
6. In modern times crops are harvested from

12.3 SOIL MANAGEMENT

The process which can preserve or increase the fertility of soil is called soil management. Soil fertility depends on the following factors:

- manure and fertilizer
- fallow
- crop cycle,
- intensive farming or multi-crop farming



- 1. Manure and Fertilizer:** Earlier also we had talked about manure and fertilizer. Adding manure and fertilizer to the soil supplies the nutrients extracted by the crops, thereby maintaining the fertility of the soil. Use of manure increases the amount of bacteria in the soil. Bacterial soil provides nutrients to.
- 2. Fallow:** Leave the field empty for some time before taking the main crop or after harvesting the crop. This process is called fallow farming. This can prevent frequent exploitation of nutrients from the soil. Insect moths and their eggs in the field are also destroyed. But this type of farming is not practiced in modern times.
- 3. Crop cycle:** Sowing of crops on any part of the soil in such a way that the fertility of the soil is maintained is called the crop cycle. In this, crops are selected in such a way that the fertility of soil is constant. For this, it is important to select a crop that needs less manure after a pulse crop or a crop that requires more manure, such as maize-pea-soybean.
- 4. Intensive farming:** Intensive farming is adopted to solve the growing population and food problem, in which maximum production is achieved by planting two to three or four crops in a year in a single field. It is also known as multi-crop farming. The following things are required for multi-crop farming:
 1. Irrigation facilities
 2. Skilled workers
 3. Availability of manure, fertilizers, pesticides



4. Market access
5. Availability Of new species

Thriving species

The improved species of various crops are as follows:

Sl.No.	Crop	Thriving species
1.	Wheat	Sonalika, welfare, gold, glory
2.	Mustard	Sangam, (), Runa
3.	Grain	Prabhat, I.R.-8, Ratna, Mahsuri
4.	Corn	Ranjit, Padma, hybrid maize, Ganga -2
5.	Potatoes	Kufri alankar, Kufri Chandramukhi
6.	Okra	Pusa sawani, Pusa makhmali
7.	Onion	Pusa Red, ratnar
8.	Radish	White icicle, pusa himani
9.	Papaya	Washington, singapore, shillong
10.	Guava	Allahabadi Safeda, Lucknow-49
11.	Mango	Alphonso, dasheri, langra
12.	Apple	Golden delicious, blood red

White Revolution

Ashok asked what is the White Revolution? The GrandFather said that the White Revolution is related to milk production. You must have known that milk is a balanced ideal diet. Our country



has the largest number of cattle but their productivity is low, so the per capita milk availability is less than other countries.

As a result of scientific research and as a result of various development programs, the breeds of cattle were improved in the 1960s. The native cattle were crossbred with cattle of foreign breeds which increased their production capacity. Nowadays the availability of milk per person is 158 grams. However, this is not satisfactory, as this quantity should be 280 grams.

The Government of India, with the help of the World Bank, has opened cooperative institutions in rural areas with the aim of collecting milk from rural areas and selling it without processing it by providing fair prices to the milk producers. Milk production has increased as a result of breed improvement and organizational action and we are third in the world in terms of total production.

Some of the more advanced species of milch animals are as follows:

Cow - Kankrej, Tharparkar, Hariana, Sahiwal, Rathi, Lal Sindhi, Jersey etc.

Buffalo - Murrah, Surti, Bhadawari.

Goat - Jamnapari, Pashmina, Angora.

Some of these breeds you can visit and observe in your cowshed.

Poultry Farming

The term poultry refers to the class of birds. Fowl, ducks, etc. birds fall in this category. They are used to meet human needs in various ways. Poultry farming accounts for 90% of this class of



birds. We get eggs, meat and other useful things from poultry farming. Initially, poultry farming was confined to the backyard or enclosures of the house. But due to improvement in breeds of poultry and changes in its maintenance, today it has taken the form of an industry. It has become a major source of income. Nevertheless, in our view, the availability of eggs and meat per capita is less as compared to other countries. Nowadays 25 eggs and 400 grams of meat are available per person in our country.

Major species of hen: Rhode Island Red, Plymouth Rock, Leghan etc. These advanced species start laying eggs at the age of 20 weeks and continue to lay eggs for life. An hen lays an average of 280 to 300 eggs in 1 year.

Major diseases of chickens: Chickens are very weak and susceptible to diseases. Due to this, the poultry industry is affected. Therefore, special attention should be paid to the cleanliness of the aviaries or their habitat and the chickens should be vaccinated. The disease named Ranikhet is more common in chickens, which can be controlled by vaccination.



ACTIVITY 12.3

What you need to do: Identify healthy eggs and spoiled eggs.

- Heat the water to lukewarm.
- Put eggs in water.

What you saw: You will see that the eggs that float above are bad and those who rests on the bottom are healthy eggs.

In this way the holidays ended, when Ashok came back to the city and met his friends, everyone told about their experience.

**WHAT HAVE YOU LEARNT**

- We have been able to get rid of the problem of food supply by using modern and mechanized equipment in agriculture.
- In modern agriculture, people use advanced species.
- The use of manure and fertilizers increases productivity.
- Yield of crops has increased by adopting new methods of irrigation.
- Biological and chemical methods are adopted to control pests, mites and diseases.
- Harvesting and threshing of crops is done with modern equipment.
- Improvement in the breeds of cow, chicken etc. has increased their productivity.
- The availability of eggs, milk and meat per person is now more than before.

**TERMINAL QUESTIONS**

Answer the following questions:

1. What is meant by the Green Revolution?
2. What is the difference between manure and fertilizer?
3. Make a list of various tools used in agriculture.
4. Write the names of the progressing species of wheat, paddy, apple and mango.

**Notes**



Notes

5. Write the scientific method of food production.
6. What is meant by the White revolution?



ANSWERS TO INTEXT QUESTIONS

12.1

(1) D (2) A (3) D (4) B (5) C

12.2

1. Manure
2. Fertilizer
3. Endosulfan
4. Storage
5. 10 percent
6. Combine

