(iv) Drip Irrigation : Drip irrigation is also called trickle irrigation or micro-irrigation. In this system water falls drop by drop just at the root zone. The system minimises the use of water and fertilisers by allowing water to drip slowly to the roots of plants, either onto the soil surface or directly onto the root zone through a network of valves, pipes, tubes and emitters. Drip irrigation is used by farms, commercial greenhouses and residential gardens. Drip irrigation is adopted extensively in areas of acute water scarcity and especially for crops such as coconuts, grapes, bananas, brinjal, citrus, sugarcane, maize and tomatoes.

# XV. Disadvantages of Excessive or Untimely Irrigation All crop plants require water at different stages of their development. Plants require the right amount of water at the right time.

- (i) Excess of water (waterlogging) in the soil inhibits the process of germination of the seeds as the seeds do not get sufficient air to respire.
- (ii) Roots do not grow well if there is waterlogging in the field.
- (iii) If the crop is irrigated when fully mature, it gets damaged. The plants, which are unable to resist the strong winds, fall down, affecting the yield. The falling down of the crop due to untimely irrigation is termed as lodging. The excess water from the field then has to be drained of immediately.

Weeding

Weeds are the unwanted plants which grow alongwith the main crops. They are undesirable because they compete with the main crop for nutrients, space, air, light and water, etc. and reduce the crop yield. They also spread pests onto the crops and sometime produce poisonous substanced which are harmful to animals and humans.

The process of removing weeds from the field is called weeding.

XVI. Time for weeding

The best time for the removal of weeds is before they produce flowers and seeds.

XVII. Some Common Weeds

Some of the most common weeds found in crop fields are :

- (i) Wild oats (Javi). (ii) Grass
- (iii) Amaranthus (Chaulai) (iv) Chenopodium (Bathua)
- (v) Convolvulus (Hiran Khuri)

## XVIII. Methods of Weeding

- (i) Manual Weeding : Weeds may be removed manually either by uprooting them or by
- (ii) By Using weedicides : The chemical substances which destroy (kill) weeds but do not harm the crop are called weedicides or herbicides. Some common weedicides in use are : Dalapon, Metachlor, Siniazine and Butachlor. These weedicides are diluted in water and sprayed in the field with a sprayer.

Weedicides must be used with care as they are poisonous and have side effects if consumed. Farmers should cover their nose and mouth with a piece of cloth during spraying to protect themselves from the harmful effects of the chemicals.

(iii) Biological Method : Weeds can also be controlled by biological methods. For example, cochineal insects are used to control the growth of the weed called opuntia.

## Protection of crops

Pests are organisms that attack and damage crops. They may be rodents (rats), insects (locusts, weevils, termites), stray animals and birds. It is estimated that 10% of our crop is destroyed every year by these pests.

Crops are also attacked by bacteria, fungi and viruses by causing several diseases. There diseases reduce the quality and quantity of the produce. these diseases get transmitted through seeds, air, soil or through insects

## (Page # 140)

XIX Pesticides The chemical substances which kill pests without harming the crops are called pesticides. These chemicals are sprayed by using a sprayer or by a low flying aircraft. The following chemicals are used to kill these pests.

- (i) Insecticides : These are used to destroy insects. Examples : DDT, BHC,, Malathion.
- (ii) Fungicides : These are used to destroy fungi. Examples : sulphur, lime sulphur
- (iii) Rodenticides : These are used to kill rodents. Examples : zinc phosphide, warfarin.
- Insecticides, Fungicides and rodenticides are collectively called pesticides

Birds can be scared away by putting scarecrows in the fields as shown in Fig. Harvesting

Once the crop has matured, it has to be gathered. The process of cutting and gathering a matured crop is know as harvesting.

All over the world harvest season is celebrated with excitement. Baisakhi, Holi, Pogal, Diwali, Nabanya and Bihu ae some of the harvest festivals celebrated in India.

XX Harvesting of grain Crops

Most of the grain crops are reaped close to the ground with the help of a sickle.

- (i) Threshing : The process of separating the grain from the harvested stalks of hay is known as threshing. This is done by spreading the harvested crop on the ground and walking over them. Animals such as bullocks, buffaloes or camels are also used on a large scale for this purpose.
- (ii) Winnowing : The process of separating the grain from the chaff is known as winnowing. Farmers hold the mixture of grains and chaff at a height and allow them to fall in a gentle stream. The wind blows away the chaff which is lighter. The heavier grains fall directly on the ground below and are thus separated. Big farms use huge machines called combines which cut, thresh as well as separate teh grain from the chaff, all at one go.
- (iii) Harvesting of other crops : Besides grain crops, all other crops like vegetable crops, cash crops, etc. are harvested through different processes and techniques. Plucking, gathering, packing, storing of crops, etc. are the different steps in the process of harvesting some specific crops.

## Storage

There are two types of food materials perishable and non-perishable.

- (i) Perishable food materials : Perishable food materials are those which get spoiled easily when kept for sometime at room temperature, for example, vegetables, fruits, fish, mat and milk.
- (ii) Non-perishable food materials : Non-perishable food materials are those which do not get spoiled even when kept for a long time at room temperature, for example, wheat flour, food grains, spices and sugar.
- XXI Modes of storage

There are two diffirent modes of storage : dry storage and cold storage.

(i) Dry storage : This method is used for storage of non-perishable food materials. Foodgrains are dried in the sun to bring down the moisture content below 14% be weight to prevent the attack by pests. The dried foodgrains are then weighed, packed in gunny bags and transferred to properly ventilated halls called godowns or granaries.

The gunney bags in the godown shoul be kept about 60 to 70 cm away from the walls and on wooden platforms about 10 to 15 cm above the ground. The godown must be kept free from pests by spraying various pesticides from time to time

Farmers store foodgrains for their personal use in metal bins. Dried neem leaves are added in the bin to prevent pest infestation.