



FACULTY OF AGRICULTURAL SCIENCES & ALLIED INDUSTRIES

- Different systems of irrigation are followed in different parts of the country.
- The best system is the one which meets the moisture seepage and evaporation.
- Principally, irrigation systems can be divided under three broad headings:
 1. **Surface Irrigation**
 - *Flooding*
 - *Basin type*
 - *Furrow type d. Ring type*
 2. **Sub-Surface Irrigation**
 - Trench method
 - Through underground pipelines
 - Perforated pipelines.
 3. **Overhead or Aerial Irrigation**
 - Sprinkler
 - Revolving Nozzles
 4. **Drip or Trickle Irrigation**

Surface Irrigation

Basin System

- In this system, circular basins are provided around the trunk of the tree.
- The basins are inter-connected in series and are fed through the main channel running perpendicular to the tree rows.
- When compared to flooding, this system minimises the loss of water.
- In this system of irrigation, the water close to trunk may bring about certain diseases like gummosis and nutrients are likely to be carried over from one basin to the other.

Furrow system

- Unlike the flood system, here the entire land surface is not covered with irrigation water.
- The furrows are opened in the entire orchard at 4” or less apart, depending upon the age of the trees.
- Water is let in these furrows from the main channels.
- In orchards, two furrows on each side of the rows are generally made.
- It is suited to such lands , which have a moderate slope to the extent of 1-2% if the water is to run freely and reach the ends of the furrows.
- Where the slope is sharp, the furrows are made to follow the contour more or less closely.
- This method has disadvantage of excess of water penetration at the head than at the farther end, which may result in variation in vigour and growth of trees.

Ring system

- This is an improvement over the basin system.\
- In this system, a ring is formed close and around the tree and water is let into the basin.
- This method is recommended for citrus trees thereby reducing the chances of collar rot to which these trees are often susceptible.

- The size of the ring will increase as the tree grows .In this system, the spread of diseases like collar rot, etc., are prevented.
- However, it involves more labour and capital and it does not permit uniform distribution of water throughout the bed or basin as in the basin system of irrigation.

Flooding

- When the land is flat, letting in water from one end floods the entire area.
- This system is commonly practiced in canal or tank bed areas.
- It is the easiest method and permits the use of bullock drawn implements in the orchards.
- But in this there is wastage of water and leads to soil erosion also.
- It encourages growth of weeds and spread of diseases like gummosis in citrus and collar rot in papaya.

Sub-surface irrigation

- This system consists of conducting water in number of furrows or ditches underground in perforated pipelines until sufficient water is taken into the soil so as to retained the water table near the root zone.
- In limited situation, this may be a very desirable system of irrigation. In general, however, it must be used with great caution because of the danger of water logging and salt accumulation. If the sub-strata are so slowly permeable that practically no water moves through, water added may stand in soil sufficiently for long time resulting an injury to the plant root due to poor aeration.
- Where irrigation water or the sub-soil contains appreciable amount of salt, sub-soil irrigation is usually not advisable.\
- Land must be carefully levelled for successful subsoil irrigation so that raising the water table will wet all parts of the field equally.

Over-Head or Aerial Irrigation

- In this system, water is applied in the form of spring, somewhat resembling rainfall.
- This is accomplished by pumping water from original source into the main supply line from where it is distributed to perforated pipes, which operate at low pressure (80 to 120 lb per square inch) and supply the water in a fairly uniform rectangular pattern.
- They have a high rate of application, usually 1”/hour or higher.
- Because of the high application rates, their use is restricted to soils with high infiltration rates, such as sandy or gravelly.
- Revolving nozzle is also at times used, which operated on either low or high pressure.
- Usually the rate of application followed in the rate of 0.2” to 0.3” per hour.

Sprinkler irrigation

- May have definite economic advantages in developing new land that has never been irrigated, particularly where the land is rough or the soil is too much porous, shallow or highly erodable.

- It is quite useful where only small streams are available, such as irrigation wells of small capacity. It is helpful in irrigating at the seedling stage when the furrowing is difficult and flooding leads to crusting of soil.
- Fertilizer materials may be evenly applied by this method.
- This is usually done by drawing liquid fertilizer solutions slowly into the pipe.
- It has several disadvantages like high initial cost, difficult to work in windy location, trouble from clogging of nozzle, interference in pollination process and requirement of more labours while removing or resetting.
- In general, this system is best adopted for areas where ordinary surface systems are inefficient.

Drip or Trickle Irrigation System

- This is the most recent system of irrigating the plants.
- It is usually practise for high value crops, especially in green houses and glass houses.
- There will be an installation of pipelines with nozzles very close to the soil.
- The nozzle is fitted in such a way that water is dripped almost in the root-zone of the plants.
- Water is allowed to move in pipes under very low or no pressure and it drop at regular interval.
- This system of irrigation has advantages like no disturbance of the soil; soil moisture is maintained, lesser leaching of nutrients from the soil.