Soil-Water relationship

- When all pores are filled with water – soil is said to be saturated
- Adhesion – attraction of water molecules towards solid particles
- Cohesion – attraction of water molecules towards each other
Three main classes of soil water

1. **Hygroscopic water:** water is held tightly to the surface of soil particles by adsorption forces.

2. **Capillary water:** water is held by forces of surface tension as continuous film around the soil particles and in capillary spaces.

3. **Gravitational water:** water moves freely in response to gravitational force and drains out of the soil. This state of water will appear when the soil is saturated.
Permanent wilting point

- The moisture content at which plant can no longer get enough moisture,
  - To meet the transpiration requirements
  - Remain wilted even if water is added to the soil

- Visible indices
  - Wilting and drooping of leaves
Water loss through the process of evapotranspiration (Source: FAO, 1998a)
Major climatic factors affecting the CWR

Temperature

Humidity

Sunshine

Wind speed

Transpiration

Evaporation

Evaporation
c) Basin method

- Adopted particularly in orchards
- Round basins for small trees
- Square basins for bigger trees
- Basin is formed for each plant or a group of plants and connected by ditches
- Each basin is flooded and water is allowed to soak into the soil

Advantages

- Unskilled labour can be used
- No risk of erosion
3. Sprinkler or overhead method

- Water is applied to the crop above the ground surface in the form of spray developed by orifices/nozzles.
- Resemble rainfall
The fertigation system

The fertigation unit

Accessories for the system
7. Soil type plays less important role in frequency of irrigation

8. Minimised soil erosion

9. Highly uniform distribution of water i.e. controlled by output of each nozzle

10. Lower labour cost

11. Variation in supply can be regulated by regulating the valves and drippers

12. Foliage remains dry thus reducing risk of disease

13. Application of nutrients at the precise time they are needed and at the rate they are utilised.