Course: Water Management in Horticultural Crops 2(1+1)
Class: 1st year, 2nd semester
Topic: Scheduling of Irrigation – Different Approaches
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SCHEDULING OF IRRIGATION – DIFFERENT APPROACHES
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Irrigation Scheduling: Scheduling of irrigation includes supply of water in **optimum quantity** at **right time** with **appropriate application method** is called irrigation scheduling.

Approaches for scheduling irrigation:

There are many approaches have been used by the scientists in the world. But each approach has its own advantages and disadvantages. The main approaches are as under.

1. Soil Moisture Depletion Approach
2. Climatological Approach
   (I) Can evapory meter
   (II) IW/CPE ratio
3. Critical Stage Approach
4. High Seed rate
5. Soil cum Sand Miniplot Technique
6. Feel & Appearance Method
7. Tensiometer or Irrometer Method

(1) Soil Moisture Depletion Approach:

The available soil moisture in the root zone is a good criteria for the scheduling of irrigation. When the soil moisture in the specified root zone is depleted to predetermined level which is different for the different crops which is to be replenished by irrigation. In crops like chilli, brinjal and cucumber irrigation is to be scheduled at 50% depletion of available soil moisture while in case of crops like cauliflower and leafy vegetables irrigation is scheduled at 30% depletion of available soil moisture.

Though, it is a good and reliable approach for the scheduling of irrigation but it is not recommended for the farmers because it is not easy to determine the available soil moisture.

(2) **Climatoligical Approach:**

Evapotranspiration mainly depends upon the climate. Evapotranspiration is determined by the climatological data. When ET reaches a predetermined level than irrigation is to be scheduled. The amount of water is given either equal to the ET or fraction of the ET, which is determined by two methods first can evapory method and second IW/CPE approach.

(I) Can Evapory Meter:

For the scheduling of the irrigation, a calibrated one litre capacity can (14.3 cm in height and 10.0 cm in diameter) is installed in the mid of field at the crop height. An indicator pointer is fixed 1.5 cm below the brim. These cans are painted white covered with the mesh. Crop is well irrigated till the field capacity obtained. The can is filled with water upto the brim. Water is losses through can due to the evaporation is directly related to the water losses from the field due to the evapo-transpiration. When the water is loses in the can upto a predetermined level, irrigation is scheduled accordingly.

(II) IW/CPE Ratio:

In this approach irrigation is scheduled on the basis of IW/CPE ratio. In this approach known amount of water is applied when the cumulative pan evaporation reaches a predetermined level.

Scheduling irrigation at IW/CPE ratio of 1 with 5 cm irrigation water means, 5 cm of irrigation water is to be applied when cumulative pan evaporation reaches at 5 cm level. Generally, irrigation is scheduled at 0.75 and 0.80 ratio with 5 cm of irrigation water.

(3) Critical Stage Approach: Every crop during its life cycle passes many stages. In each crop, among these stages, there are some growth stages when the deficiency of water causes irrevocable yield losses, these stages are called critical stages. When the irrigation water is limited, this approach is more useful. Under limited water supply conditions, water is applied only at the moisture sensitive stages and skipped at non sensitive stages. For example in potato water is applied at the stolen and tuber formation and tuber enlargement stages.

(4) **High Seed Rate:** First, select some elevated area of one cubic metre in the field. Than in this selected area, seed rate is increased by four times. Due to high seed rate and elevation, plants of this 1 m^3 area expressed wilting symptoms than rest of the field, indicating the need of scheduling of irrigation.

(5) **Soil cum Sand Miniplot Technique:** In this approach, 1 m^3 pit is dug in the mid of the field. Then, about 5 to 10% sand is well mixed in this soil. The pit is filled with sand mixed soil. In the field, sowing is done as usual. Due to the presence of sand, plants of pit express wilting symptoms earlier than the rest of the field. This shows the need of irrigation scheduling.

(6) **Feel & Appearance Method:** Moisture content can be roughly estimated with taking the soil from crop root zone and making the ball. But this method requires lot of experience to estimate soil moisture.

(7) Indicator plant

There are some plants sensitive to soil-water variations. They may be used for detecting the water stress in crops that do not show symptoms of water stress easily or exhibit the same when they have already suffered seriously. An indicator plant for irrigation should be such that it shows the water stress before the crop

has suffered from it. When an indicator plant is grown in a crop field, care should be taken not to shade the plant by crop plants. Sunflower plants are often used as indicator plants in onion crop.

(8) **Irrometers or Tensiometer:** Irrigation can be scheduled on the basis of soil moisture tension. Tensiometer is installed in the field at specified depth. And irrigation is scheduled at predetermined level of soil moisture tension like 0.5, 0.75 and 1.0 bar. This method only determined the soil moisture tension but not the quantity of water is to be applied in one irrigation.

High seed rate, soil cum sand miniplot technique and feel & appearance methods is relatively easy to use by the farmers.