Irrigation Engineering Principles

Lecture 1

Prof. Dr. Basim Sh. Abed

Lucturer Zainab Adul-llah

Irrigation- Definition :

- Is the artificial application of water to supply the moisture essential for plant growth.

- **<u>Purposes of Irrigation:-</u>**

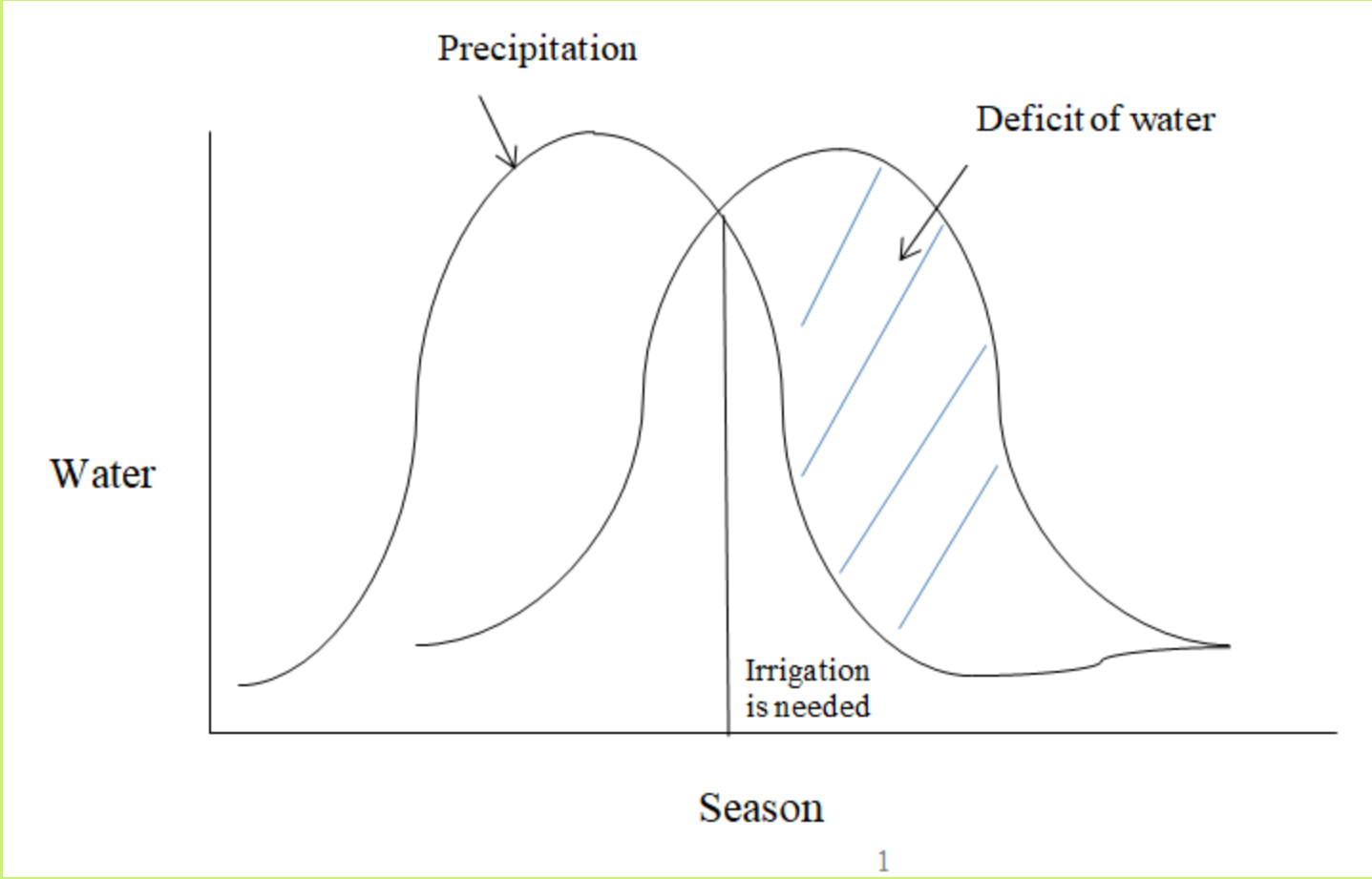
1. To supply the moisture for plant growth.
2. To provide insurances against short duration drought.
3. To cool the soil and atmosphere.
4. To wash out harmful salts from the soil.
5. To soften the soil.

- **Irrigation water is applied to supplement the following sources.**

1. Precipitation.
2. Atmospheric water other than Precipitation.
3. Flood water.
4. Ground water.

Precipitation: - to be effective and useful for plant growth; it must:

1. Be sufficient to supply the required soil moisture.
2. Have a sequence adequate for plant growth.
3. Have low intensity so it can penetrate the soil.



Net depth of irrigation (d_n): Is the depth of water applied and stored in the root zone (d_n) it is the only water available for plant growth.

Gross depth of irrigation: Is the depth of water applied in order to store the net depth of irrigation.

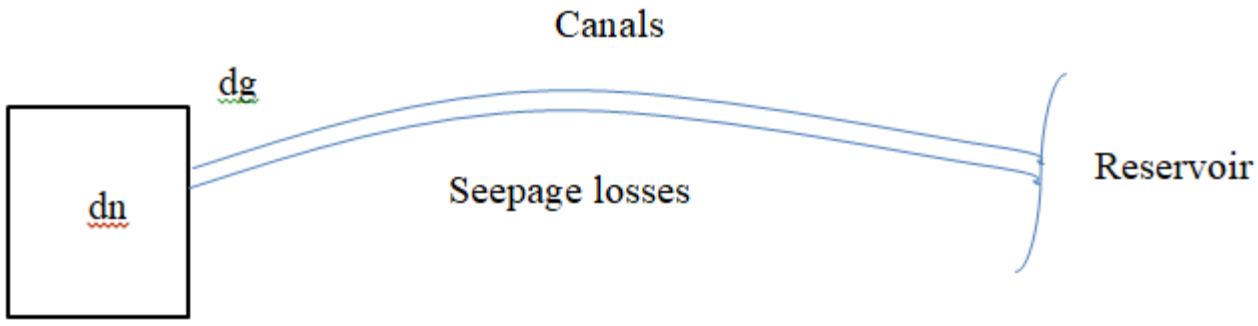
$$dg = dn + water\ losses$$

$water\ losses$ = surface runoff + deep percolation

Irrigation Efficiency (application efficiency):

$$IE\ or\ Ea = \frac{dn}{dg} \times 100$$

Total depth of water (d total): Is the depth of water diverted from the irrigation source (reservoir) for the purpose of irrigation.



$$d\ total = dg + canal\ losses$$

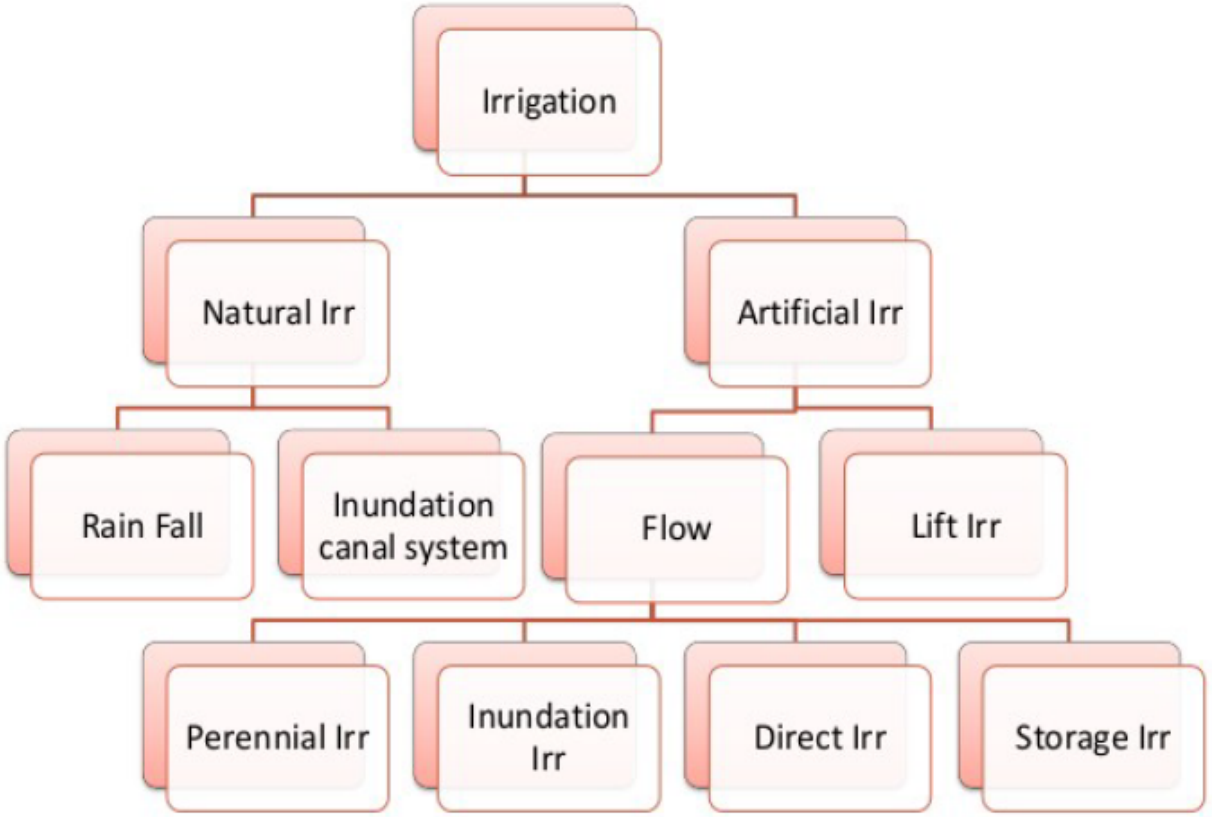
Conveyance efficiency: Is the percentage ratio between the gross depth of water to the total irrigation depth.

$$Ce = \frac{dg}{dt} \times 100$$

Effective rainfall: Is that part of the rainfall which can be used as dependable source of irrigation water, usually expressed as *mm/day*, mm/month and equals a percent of total rainfall depth

$$\text{Eff.} = \text{P\%} \times depth\ of\ rainfall$$

Types of Irrigation OR Classification of Irrigation:



Advantages of irrigation

Advantages of irrigation can be direct as well as indirect.

I.Direct Benefits

- The grower has many choices of crops and varieties and can go for multiple cropping for cultivation
- Crop plants respond to fertilizer and other inputs and there by productivity is high.
- Quality of the crop is improved.
- Higher economic return and employment opportunities. It makes economy drought proof.
- Development of pisciculture and afforestation. Plantation is raised along the banks of canals and field boundaries.
- Domestic water supply, hydel power generation at dam site and means of transport where navigation is possible.
- Prevention of damage through flood.