I IRRIGATION EFFICIENCIES

• Efficiency is the ratio of the water output to the water input, and is usually expressed as percentage.

• Input minus output is nothing but losses, and hence, if Losses are more, output is less and, therefore, efficiency is less. Hence, efficiency is inversely proportional to the losses.

• Water is lost in irrigation during various processes and, therefore, there are different kinds of irrigation efficiencies, as given below

•Efficiency of Water-conveyance

•Efficiency of Water Application

•Efficiency of Water Use

•Efficiency of water storage

•Water Distribution Efficiency

1.1 Efficiency of Water-conveyance (η_c)

• It is the ratio of the water delivered into the fields from the outlet point of the channel, to the water entering into the channel at its starting point. It may be represented by η_c. It takes the conveyance or transit losses into consideration.

$$\eta_c = (W_f/W_r) \text{ X } 100$$

Where

▪ η_c= Water conveyance efficiency,

▪ W_f= Water delivered to the irrigated plot at field supply Channel,

▪ W_r= Water diverted from the source (river or reservoir)

1.2 Efficiency of Water Application (η_a)

• It is ratio of water stored into the root zone of the crop to the quantity of water delivered at the field (Farm).

$$\eta_a = W_s/W_f \text{X } 100$$

Where,

▪ η_a= Water application efficiency,

- W_s= Water stored at the root zone during the irrigation
- W_f= Water delivered to the farm.

1.3 Efficiency of Water Use (η_u)

- It is the ratio of the water beneficially used including leaching water, to the Quantity of water delivered. It may be represented by η_u

$$\eta_u = (Wu/Wd)\ X\ 100$$

Where,

- η_u= Water use efficiency,
- Wu = Beneficial use of water or consumptive.
- Wa = Water delivered to the field.

1.4 Efficiency of water storage: (η_s)

- The concept of water storage efficiency gives an insight to how completely the required water has been stored in the root zone during irrigation.

$$\eta_s = (Ws/Wn)X\ 100$$

Where,

- η_s= Water storage efficiency,
- Ws = water stored in the root zone during irrigation.
- Wn = Water need in the root zone prior to irrigation.

1.5 Water Distribution Efficiency (η_d)

Water distribution efficiency evaluates the degree to which water is uniformly distributed throughout the root zone. Uneven distribution has many undesirable results. The more uniformly the water is distributed , the better will be crop response.

$$\eta_d = 100\ (1-y/d)$$

Where,

- η_d= Water distribution efficiency,
- y= avg numerical deviation in depth of water stored from avg depth stored in the root

zone during irrigation

- d = Avg depth of water stored during irrigation..

1.6 Consumptive use Efficiency (η_{cu})

It is the ratio of consumptive use of water to the water depleted from the root zone.

$$\eta_{cu} = (W_{cu}/W_d) X\ 100$$

Where,

- η_{cu}= Consumptive use efficiency,
- W_{cu}= Nominal consumptive use of water
- W_d= Net amount of water depleted from the root zone soil.

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