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By-Jaspal Sir

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IRRIGATION ENGINEERING

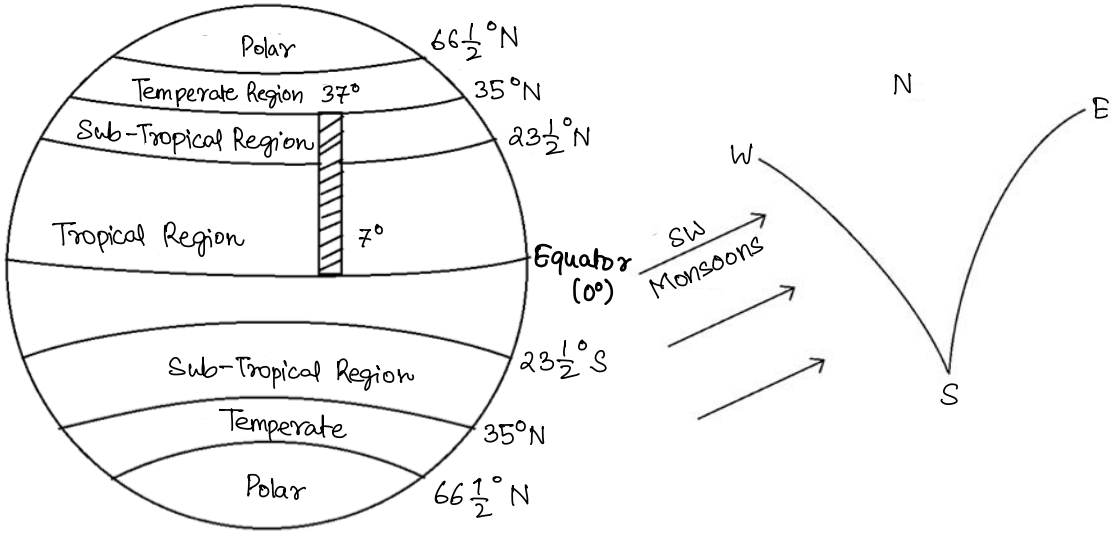
-JASPAL SINGH
(EX IES)

CONTENT

INTRODUCTION TO IRRIGATION

Q. Why Irrigation is Required in India.

Ans:



- Every Crop Requires Certain amount of Water at Regular Interval throughout the growth period at desired time so that the Crop may attain Maturity.
- If in an area natural Rainfall is both timely and Sufficient then irrigation facilities are not required to develop.
- In a tropical Count rylike India Rainfall is neither sufficient not timely therefore irrigation facilites are required to be developed
- Water Requirement of Crop may not be fulfilled by Natural rainfall, in Such case also irrigation facilities are required to be developed, so that adequate amount of Water may be Supplied to the Crops required for acheiving max. Cultivation.

RICE
(Kharif Monsoon)
(June - Sept)
↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓
Sowing (June) — Cultivation (Sept)

WHEAT
(Rabi Winter)
(Nov - March)
↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓
Sowing (Nov) — Cultivation (March)

Hence, Irrigation may be defined as artificial application of water at desired interval for Specific duration throughout the Entire growth Period of Crop So as to attain full maturity.

Note: Classification of area Based On defficiency of Rainfall.

ARID (Dry)
- These are the area where for Cultivation of any type of crop irrigation is must

Semiarid {Semi-dry}
- These are the areas where Cultivation of inferior Crops can be done without Irrigation.

Ex :→ Thar, Kacchch
Leh and Ladakh

Ex → Telangana, Bundelkhund,
Vidharbha.

Note: Inferior Crops : These are those crops which can be cultivated in inferior condition. Here interior conditions corresponds to
(a) Poor Quality of soil
(b) less Availability of water
Example — Bajra, Jowar
- These inferior crop shows low Yield and high Suicide.

•• ADVANTAGES OF IRRIGATION

(i) Obtaining maximum yield since by developing irrigation facilities we can supply adequate amount of water which is required by the crop max. yield is obtained.

$$\text{Yield : Yield} = \frac{\text{Cultivation}}{\text{Area}} = \frac{(\text{tonnes})}{\text{Hectares}} \qquad \{1 \text{ hec} = 10^4 \text{ m}^2\}$$

(ii) Elimination of mixed cropping
- Growing of 2 or more crops together in the same field in the same time is called mixed cropping
- Mixed cropping has following drawbacks
(a) Max Yield cannot be obtained from entire area, at any given time quantity is reduced.
(b) Therefore irrigation helps in eliminating mixed cropping, because adequate amount of water can be supplied to crop that is required for its max yield.

(iii) Improving Domestic water Supply :→ Development of irrigation facilities in an area helps in increasing/supporting the water supply in nearby villages and towns where other sources of water is not available or there is scarcity of water.

(iv) Generation of Hydro-Electric power :→ Cheaper power generation can be obtained from water development project primarily design for irrigation.

(v) Facility of Communication :→ Irrigation channels are primarily designed for embankments and inspections road which connect as the mode of communication also.

(vi) Afforestation :→ Trees are generally grown along the banks of the channel which increases the proportion of green cover and also helps in reducing the soil erosion.

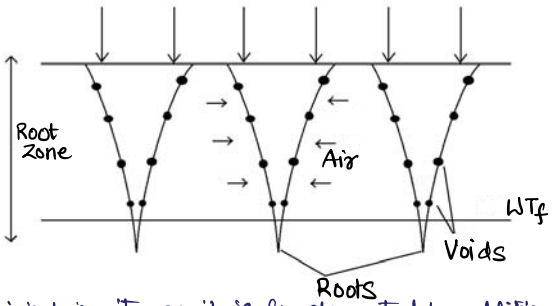
(vii) Optimum Benefits.

(viii) General prosperity.

•• DISADVANTAGES OF IRRIGATION

(i) Irrigation may lead to creation of wet climate condition, which results in ambient growth of mosquitos and micro-organisms that increases the risk of water-borne disease.

(ii) Intensive irrigation may lead to waterlogging if water is applied over a agricultural land or field than certain fraction get lost due to seepage and ultimately joins ground water.
- If the process continues for few successive years, then ground water table rises and if it reaches upto root zone, which will result in choking of poses present in the roots, that are responsible for Aeration, hence growth of crop reduce.



(iii) Since Indian soils are deficient in nitrogen, it is supplemented by addition of fertilizer (Urea, NH_2, $CONH_2$) which along with water seeps upto ground water level, thereby increases Concentration of NO_3^- in it.

- If this ground water is used for domestic use, it may lead to methemoglobinemia.

•• TYPES OF IRRIGATION

Irrigation is broadly classified into 2 types :→

(i) Surface Irrigation

(ii) Sub-Surface Irrigation

(i) **SURFACE IRRIGATION:** In this method water is applied over the surface and agricultural field remaining in wet condition.

- It is further classified as :→

(a) Flow Irrigation (b) Lift Irrigation.

(a) **FLOW IRRIGATION:** → When the water is available at higher level and it is supplied to the lower level by the action of gravity then it is termed as flow irrigation.

(b) **LIFT IRRIGATION:** If the water is lifted by some mechanical or manual mean and then supplied for irrigation, it is termed as lift irrigation.

- Use of tube well, open wells for supplying irrigation water falls in this Category.

- Flow Irrigation is further classified as —

(A) Perennial irrigation (B) Flood irrigation.

(A) **PERENNIAL IRRIGATION:** In this system of irrigation constant and continuous water supply is assured to the crops in accordance with the requirement of the crop throughout the crop period in this system, water is supplied through canal distribution system, taking off from a reservoir and weir.

This Perennial Irrigation is further classified as :→

(1) Direct Irrigation (2) Storage Irrigation

- When Irrigation is done by deviating the river runoff into the main canal by using diversion headwork across the river it is termed as direct Irrigation.

- If the dam is constructed across a river to store the water during Monsoon, so as to use in dry Period is termed as Storage Irrigation.

(B) **FLOOD IRRIGATION:** This type of Irrigation is also termed as Inundation Irrigation.