

IRRIGATION ENGINEERING

Topics

- Introduction
- Need for irrigation
- Advantages and disadvantages of irrigation
- Environmental impacts of irrigation
- Systems of Irrigation:
 - Gravity irrigation,
 - Lift Irrigation,
 - Well and Tube well Irrigation,
 - Infiltration galleries,
 - Sewage irrigation,
 - Supplemental irrigation

Irrigation

- Defined as – *the process of supplying water to land by artificial means*
- Basic objective to supplement natural supply of water, *for raising crops with economic and efficient system.*
- Controlling and harnessing various natural resources.
- To achieve it, irrigation systems are required
- Irrigation system includes
 - *Planning, Design, Construction, Operation and maintenance of structures*
- Efficient irrigation system is engineer's responsibility.

Need for Irrigation

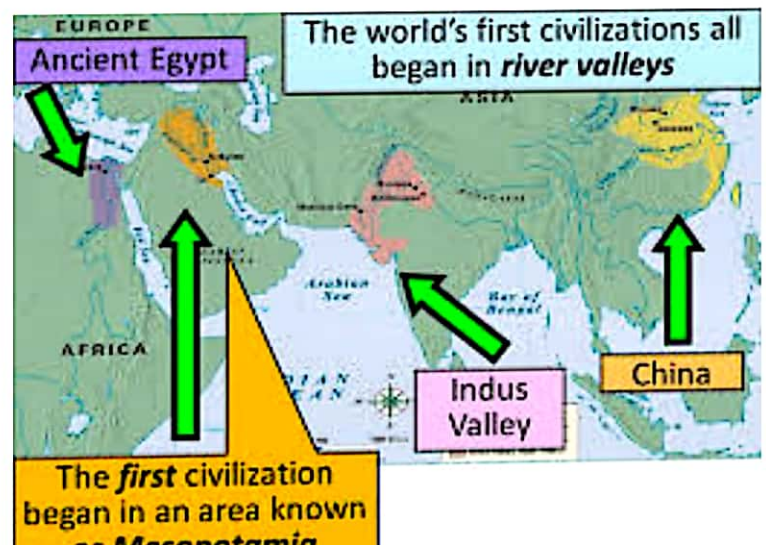
- In India majority of agricultural production is monsoon driven.
- Due to non uniform distribution of rainfall with space and time, it is essential to have scientific and engineering solution.
- Irrigation is required when,
 - Inadequate/Less rainfall
 - Transfer from abundance to deficit area
 - Indira Gandhi canal – from Sutlej to Thar desert
 - Uneven distribution
 - Area
 - Intensity and Time scale
 - Average annual rainfall: Thar (100mm) to Assam (>2500mm)
 - Mawsynram, Meghalaya, India (highest avg. annual rainfall 11,873 mm)
 - Number of Crops in a year

Scope of Irrigation Engineering

- Engineering Aspect
 - Development of sources of water: *first phase*
 - Dams – when non-perennial rivers are source
 - Weirs/Barrages – when water is diverted to canals, perennial rivers
 - Arrangement of conveyance: *second phase*
 - *Reservoirs, canals/diversion structures*
 - *Groundwater extraction system*
- Agricultural Aspect
 - Systematic and Timely application to fields
 - Proper leveling and shaping of fields
 - Soil type and classification
 - Appropriate cropping pattern, climatic factors
 - Conservation of soil (against erosion)

- **Management Aspect**

- Deals with successful implementation and efficient management
- Cultivation of crops in scientific manner
- Training of farmers
- Sufficient and Rational distribution of waters to farmers
- Charging of water using suitable and scientific methods



Advantages	Disadvantages
Increase in crop yield	Waterlogging
Protection from famines	Mosquito breeding
Cultivation of superior crops	Unhealthy climate: due to cold climate
Elimination of mixed cropping	Pollution of rivers and groundwater
Prosperity to farmers and Country	
Hydroelectric power generation	
Domestic and Industrial water supply	
Inland navigation	
Increase in ground water storage	
Canal plantations: supply timber	