

# **ROLE OF INFRASTRUCTURE IN MANAGEMENT OF WATER**

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# What Necessities to have water infrastructure

- Water is not available where it is needed
- Water is not available when it is needed
- Both situations require water infrastructure

# Water Availability - Pakistan Specific

- Pakistan is one of the world's most arid countries
- Over 75% of it receives rainfall less than 250 mm annually and 20% of it less than 125 mm.
- The population and economy are heavily dependent on an annual influx into Indus River System of about 191 BCM of water mostly derived from snow and glacier melt.
- Since 2002, 12 BCM of water has been blocked by India by constructing storage dams on the eastern rivers.
- To meet water demand we must have 40% storage capacity of total water availability.
- Present storage capacity is only (9.50%) i.e. 17.0 BCM – required (40%) i.e. 71.0 BCM
- 85% of river flow is transboundary. It passes through Indian held Kashmir. India's continuous interference with river flows threatens Pakistan water security ---- Water terrorism

# Water Availability - Pakistan Specific

- Surplus water is only available during 30 to 40 days, over 300 days water availability is less than demand. i.e. we are in a hydrological drought condition every year
- Seasonwise water availability is 89% in Kharif and only 11% in Rabi whereas national requirement is 40% in Kharif and 60% in Rabi. Storage infrastructures are absolute essential for storing and transferring water from Kharif season to Rabi season.
- Additional storage requirement is 51 BCM
- Climate Change would result in violent hydrological cycles – Severe Floods – Prolonged Droughts, Melting of glaciers would result in less water
- With astronomical population growth Pakistan would be in severe water scarcity situation

# Role of Water Infrastructure in Economic Development of Pakistan

- Prior to construction of Mangla, Chashma and Tarbela storage reservoir's, Pakistan was heavily dependent on dietary supplement under PL480 when the population was only 35 million. Pakistan's industrial base particularly export oriented industries were non – existent
- After Mangla and Tarbela over 3000 industries were established in Pakistan and the number kept on increasing
- Development of water infrastructure in sixteen's and seventies provided food security and cheap hydropower which gave boost to the economy and in seventies and eighteens Pakistan's economy was one of the fastest growing economies of the region

# Role of Water Infrastructure in Human Resource Development

- Indus Basin projects were the largest civil engineering projects ever undertaken in the history of the world.
- Man power trained on Indus Basin Projects - engineers, technicians, dozer operators, dumper operators, crane operators, surveyors, tunneling experts etc.
- Big demand of skill labour force in the Arabic world – petro economy.
- Remittances received in Pakistan over the next 10 years were more than the money spent on the construction of Indus Basin replacement works

# Role of Water Infrastructure Providing Protein Rich Diet

- **Prior to storage in the north, the sea fish was supplied from Karachi and was expensive. Low income group could not afford it. With creation of storages, fresh water fish became available in abundance and at affordable price and provided protein rich diet to all segment of society.**

# **Role of Water Infrastructure**

## **Rise of Water Table Around Haripur Basin**

- **Case study of Tarbela dam impact indicates water table was at more than 800 feet depth. With Tarbela reservoir the water table rose to 100 to 150 feet within a few years.**
- **Shallow tube wells were installed and over 10,000 acres of barren land turned into most fertile land producing high value crops.**
- **The price of land jumped from a few hundred per kanal to over hundred thousands.**
- **Once farmers living in extreme poverty became most prosperous farmers.**



# **Role of Water Infrastructure Reservoirs in the North Provide Resting Ground to Million of Migratory Birds**

- **The reservoirs build in the north fall on the international migratory flight route No.4. Thus providing birds sanctuaries and resting ground to millions of migratory birds.**