

# **Aging Water Infrastructure: The Need for Redundancy in Water Systems**

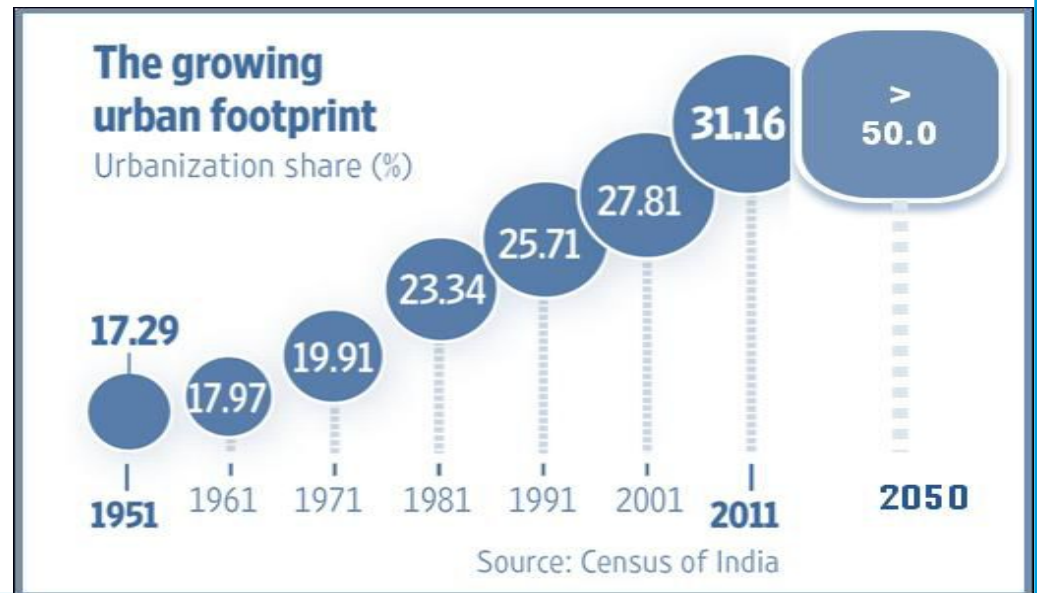
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# Urban Population Projection

## Projection:

- More than 50% of the country's population will be Urban by 2050



## India's cities In 2011

**377 million**  
People live in urban areas

The top ten cities have a  
population of **93 million**

**160 million**  
people live in  
metropolitan areas

**52%** is the urban share of  
GDP in 2004-05

## Projected ... In 2031

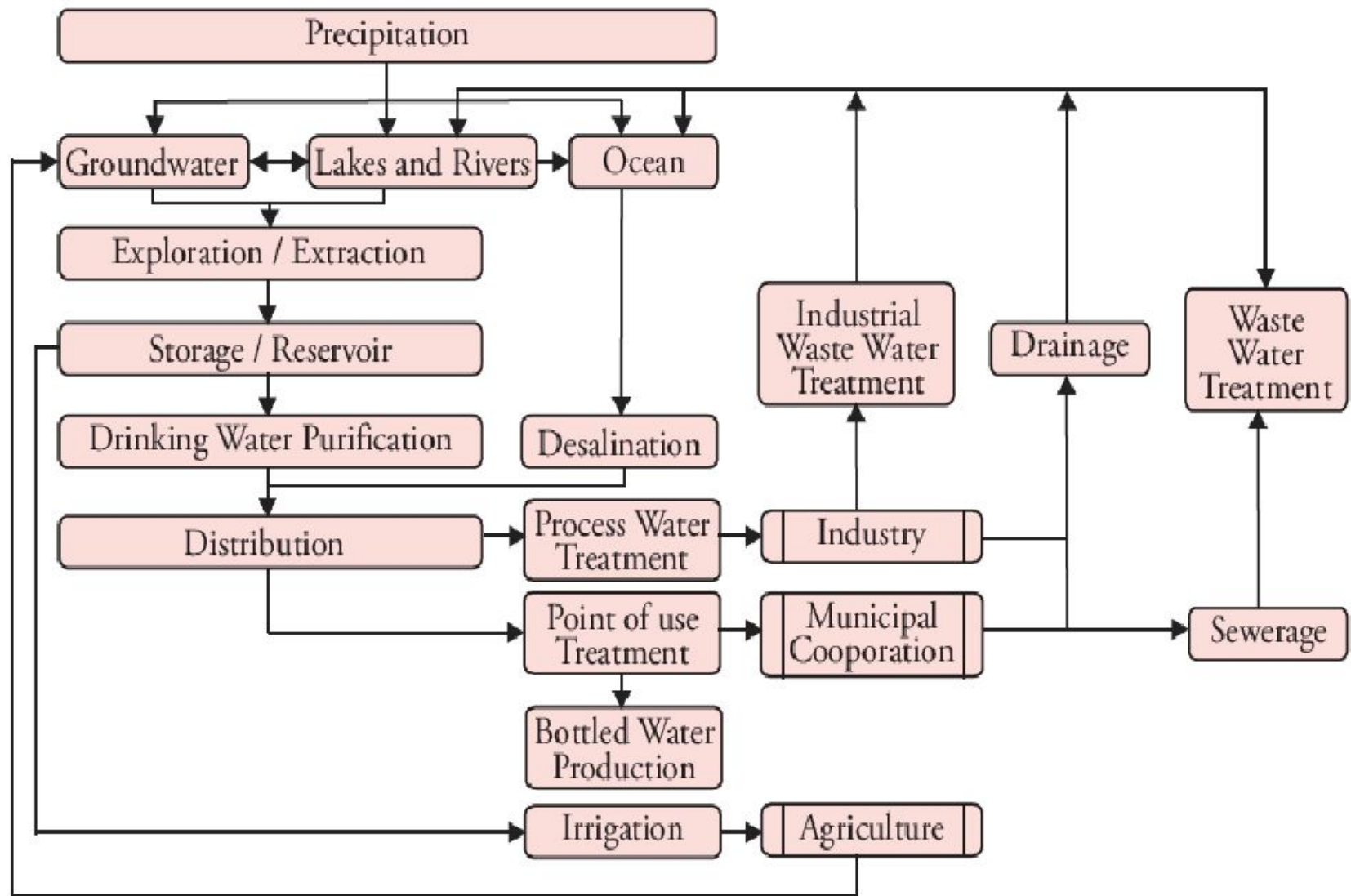
**600 million**  
People will live in urban areas

The top ten cities will have a  
population of **140 million**

**255 million** people will live  
in metropolitan areas

**75 %** GDP in urban areas

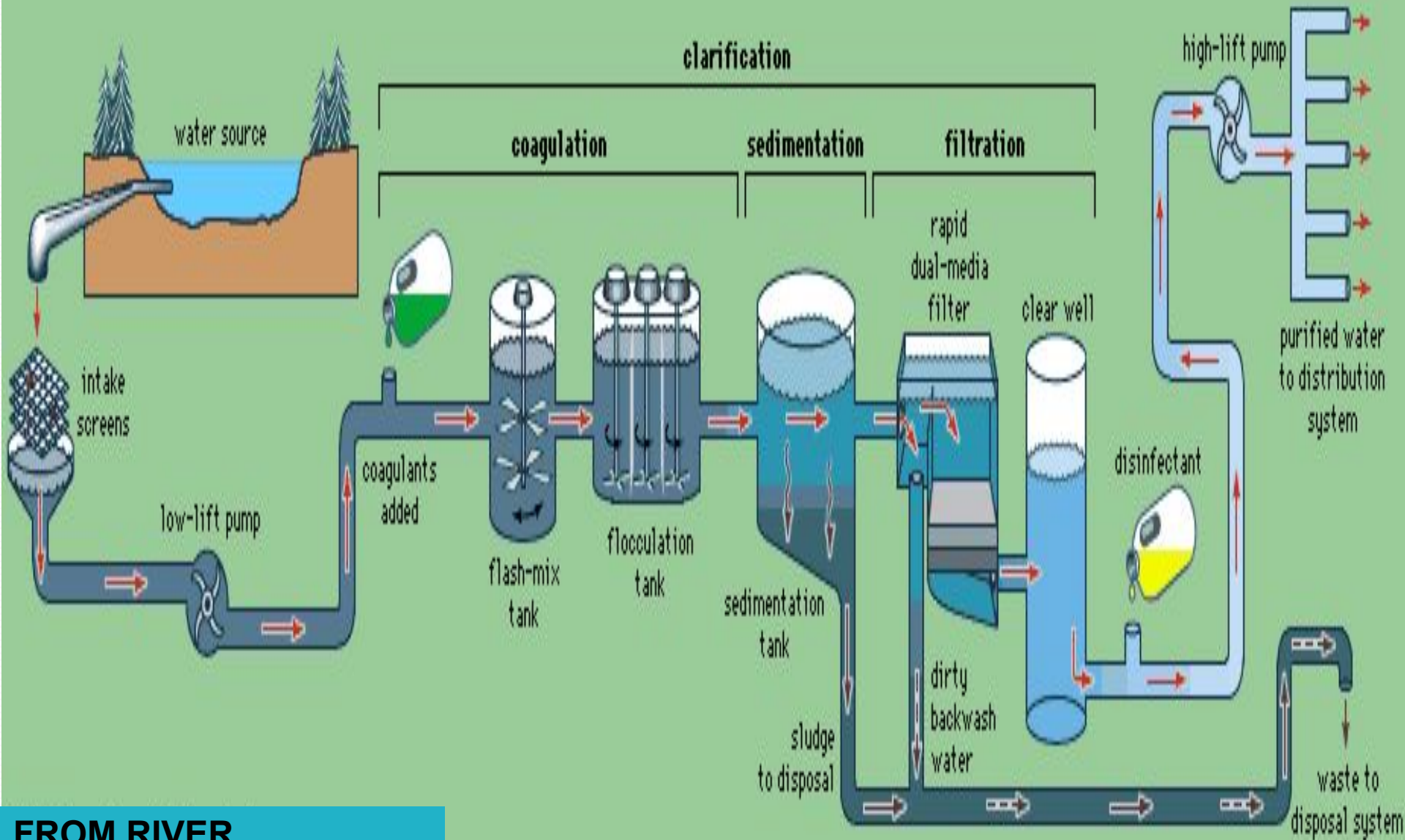
Source: NIUA



Source: IDFC PE Research (2010).

## SOURCES OF WATER RESOURCES

# CITY WATER TREATMENT PLANT AND DISTRIBUTION-DEPENDABILITY OF AGEOLD INFRASTRUCTURE

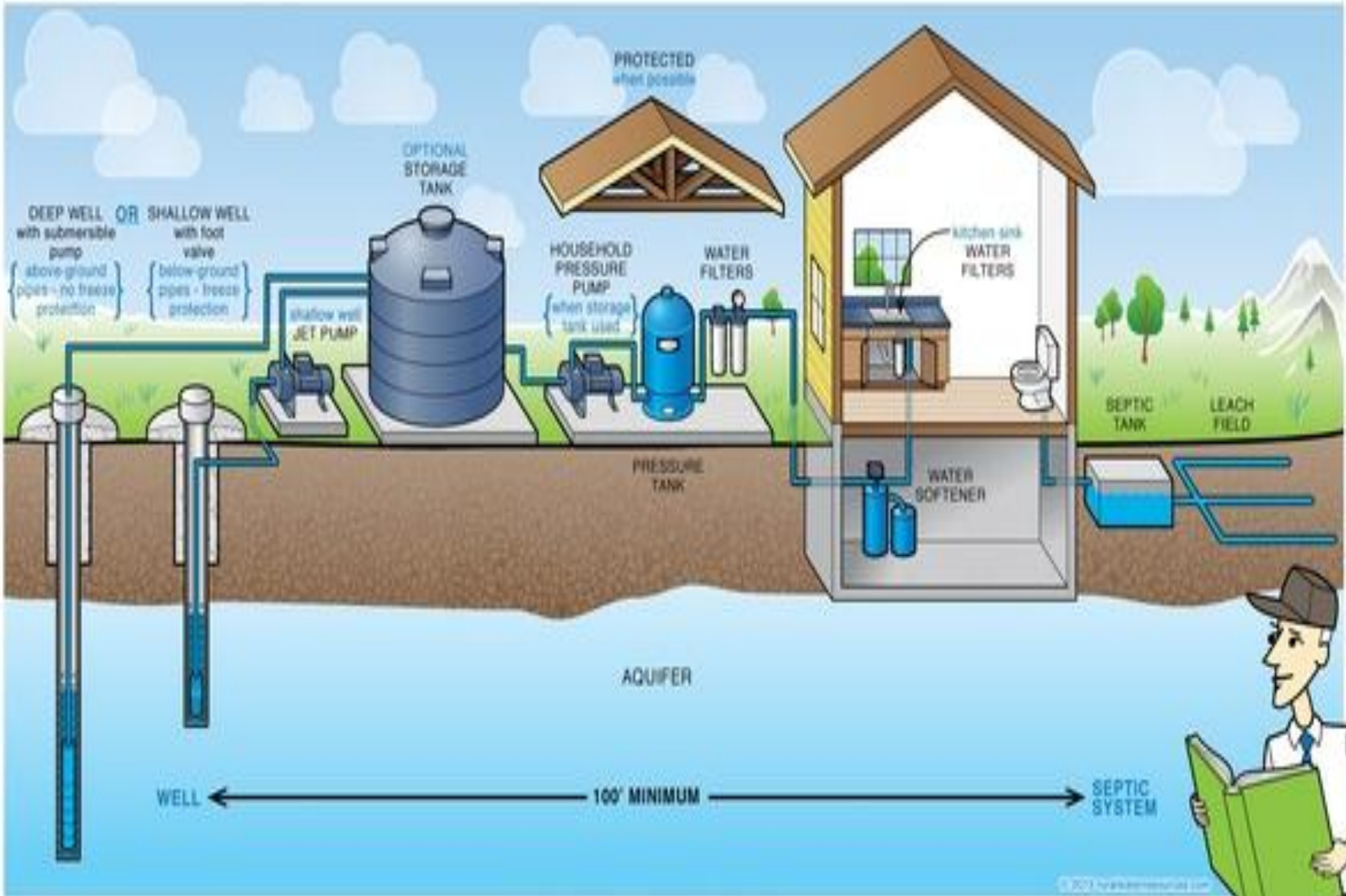




# Water Supply & Distribution System

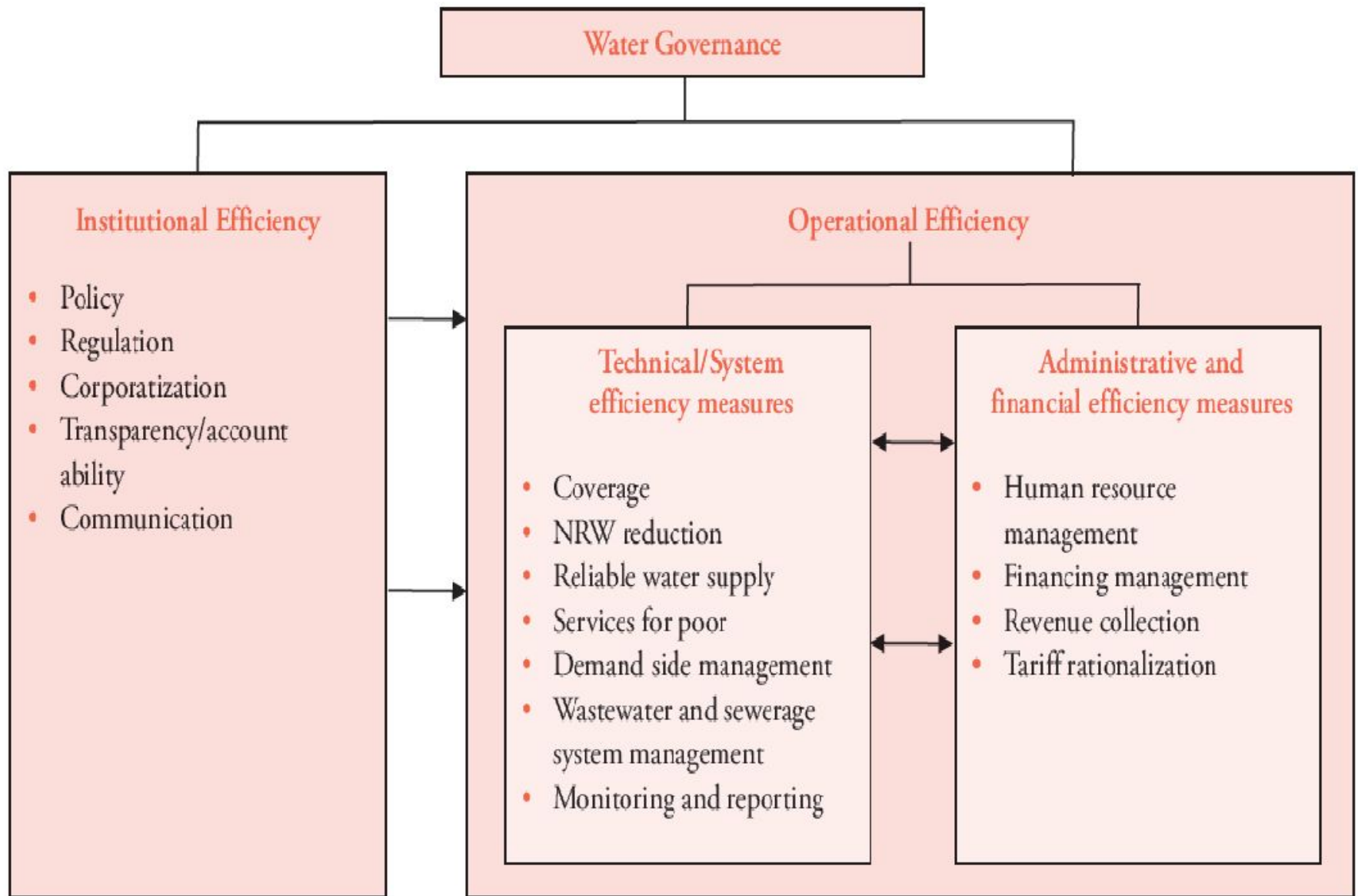


# Typical Well Equipment Connection



Information created by Rural Water Resources

From internet sources





# The Case of Unsustainableville

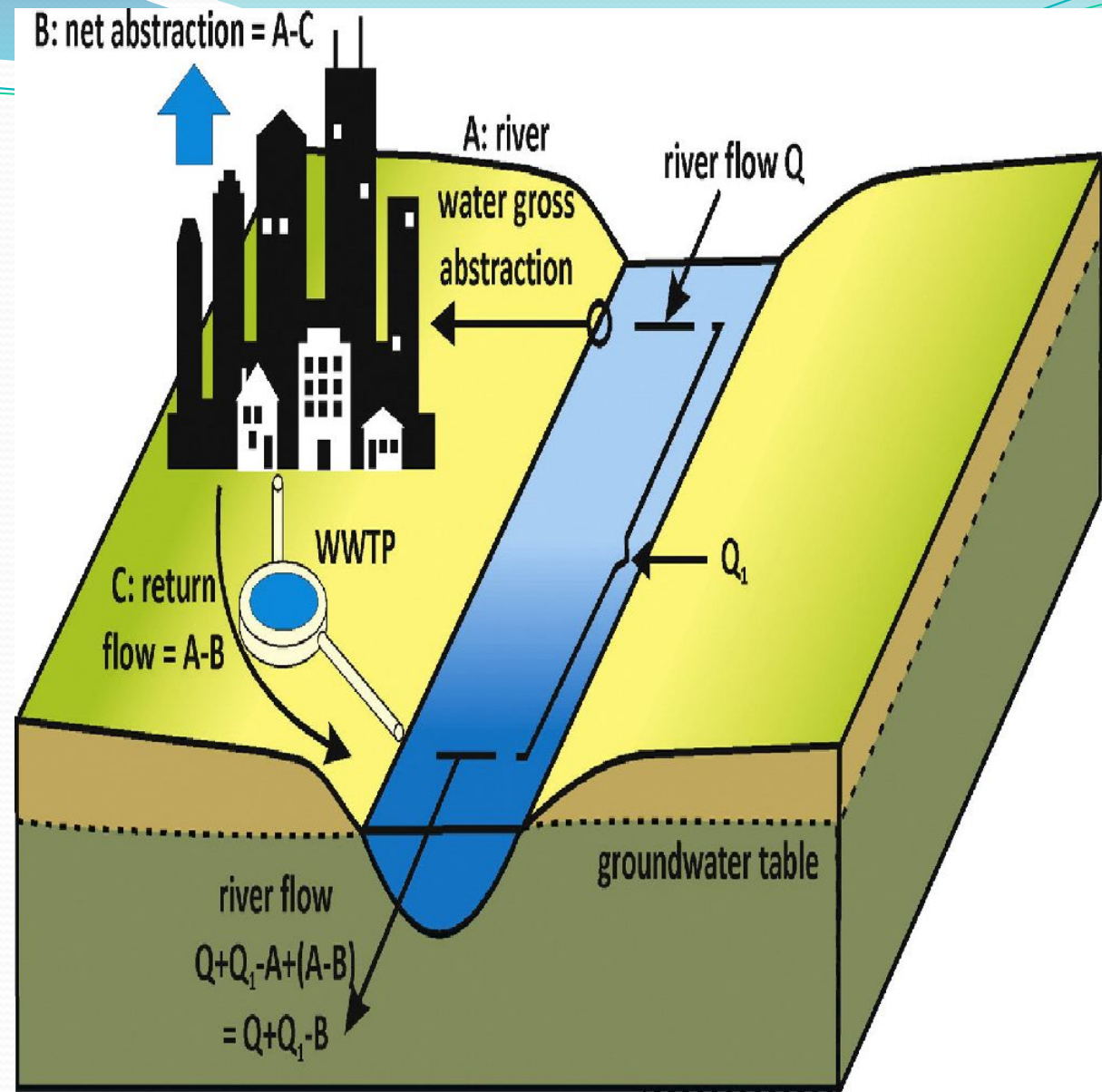
ASSET  
MANAGEMENT



DATA ANALYTICS AND SCADA, INSTALLATION OF  
SENSORS, GIS

From internet sources

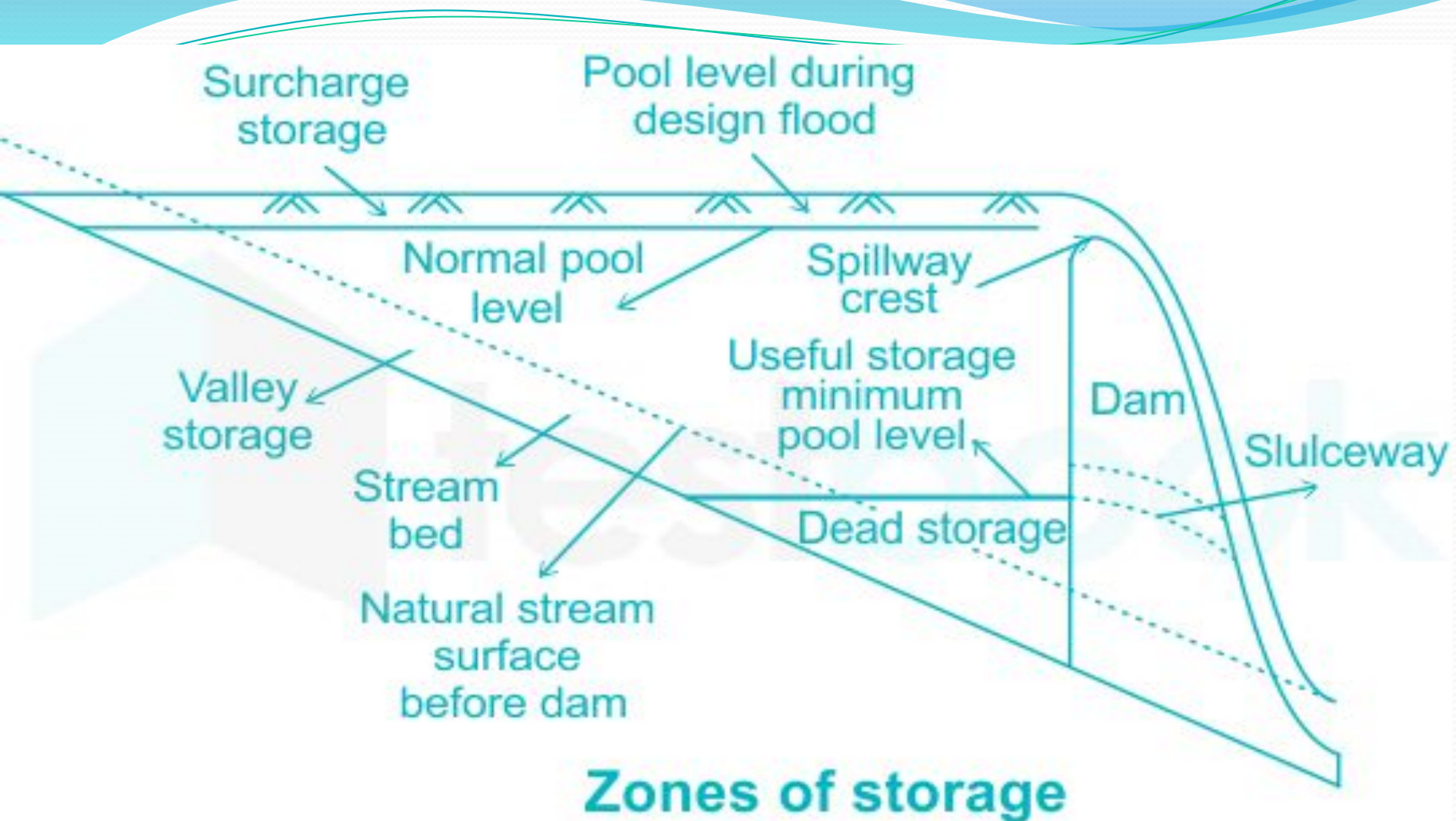
- Water scarcity has many aspects
- Progressively less and less water reaches downstream regions in a river basin due to heavy abstraction in upper reaches and in addition there is reduced base water contribution to river flow in lower reaches
- Thus, groundwater extraction increases in downstream areas as wetlands and lakes run dry
- Increasing sea water intrusion in coastal areas
- Rising conflict between interstate and inter basins
- Effective demand management in cities and water conservation measures at local scale
- Will increase ground water levels and let rivers flow till the ocean



Hoekstra et.al, 2018



## DAM STORAGE- INCREASING DEAD STORAGE LEVELS



**DAM STORAGE- REDUCING LIVE STORAGE IN DAMS,  
INCREASING SATURATED SOIL PRESSURE ON THE DAM STRUCTURE  
AGEING DAM INFRASTRUCTURE, NEEDS FOR FREQUENT REPAIR AND CLOSE  
MONITORING  
NEED FOR ENCAPSULATING STRUCTURE**

Water infrastructure inspection and maintenance • Major Desilting required in Dams and Canals • Backup Emergency water supply systems



Viewing looking upstream of reservoir during desilting

operations.



# **BACK UP EMERGENCY WATER SUPPLY AT CITY LEVEL TREATED WASTEWATER IS WATER OUT OF PLACE**

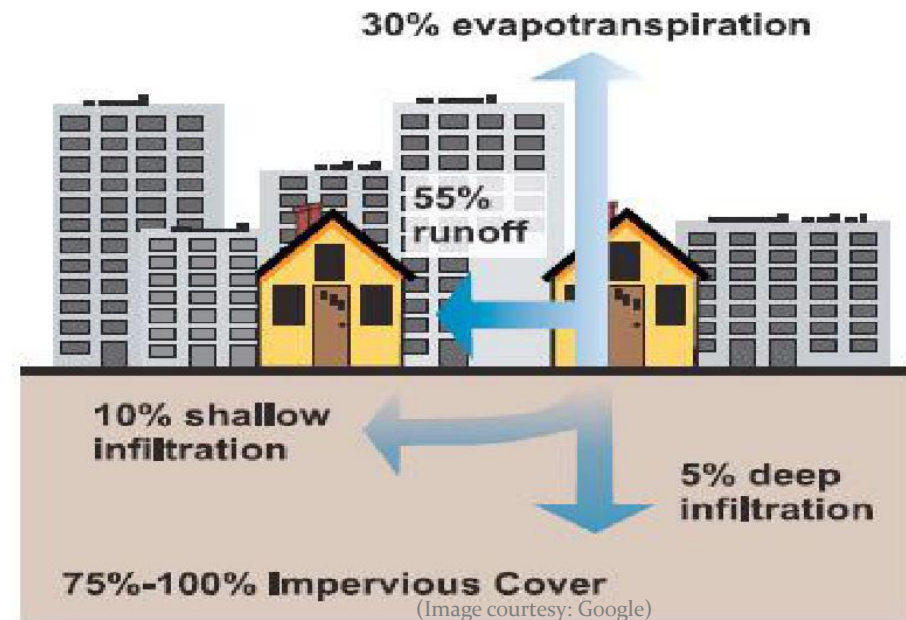
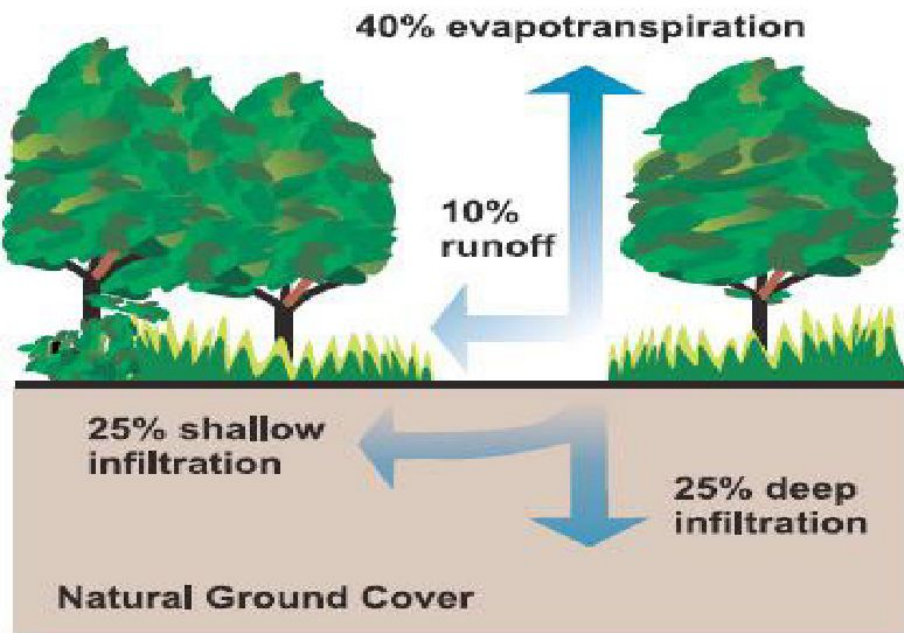
- i. NEW WATER**
- ii. Improved water availability during dry season for domestic and agricultural uses, January - May –LOCAL GROUND WATER  
AQUIFER MANAGEMENT
- ii. Reduced flood risk during the monsoon season, June-August
- iv. INCREASING FLOODABLE SPACES IN CITY AREAS





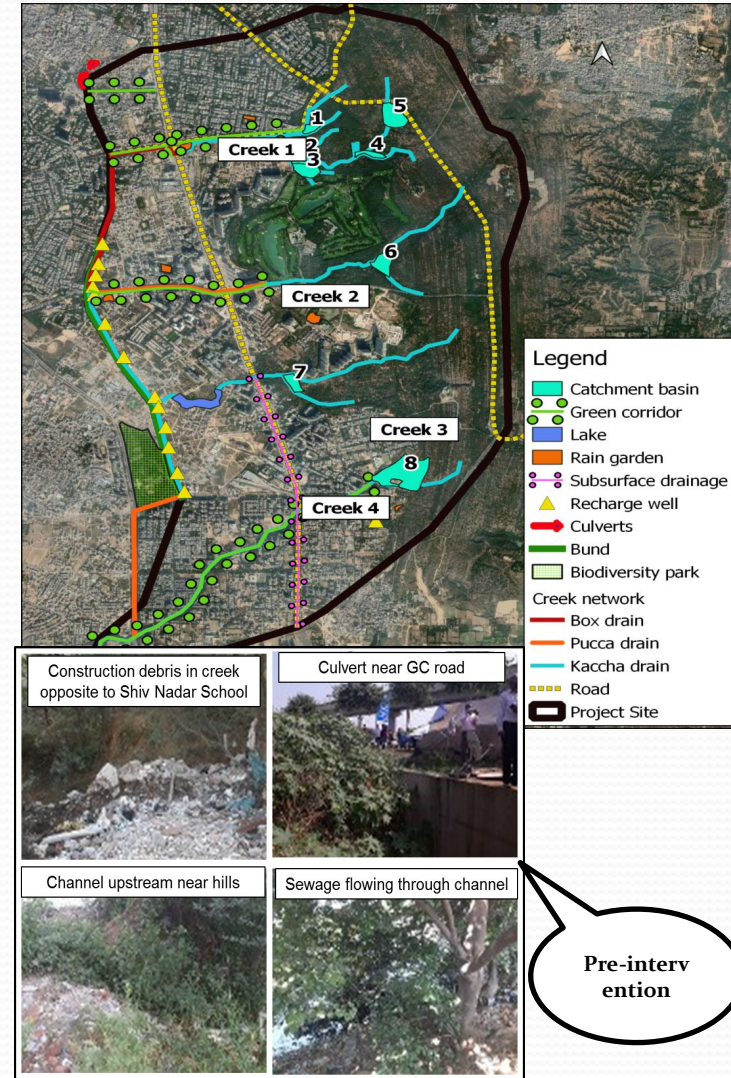
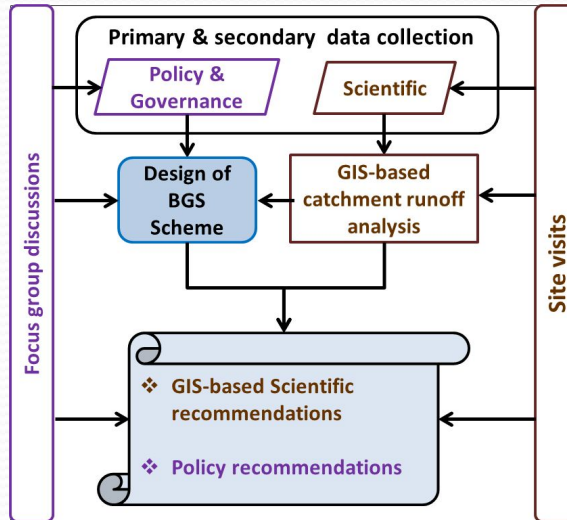


## Existing Urban Watershed Condition—Need to Create and restore **Urban Green and Blue Spaces**





# Blue Green interventions for addressing flooding along Golf Course Road in Gurugram







**Aravalli Biodiversity Park Gurgaon-Making of a city forest  
NGO-I AM GURGAON, Municipal Corporation of Gurugram**

**Assessment of Groundwater Recharge Potential,  
Carbon Sequestration, Air Quality Monitoring**



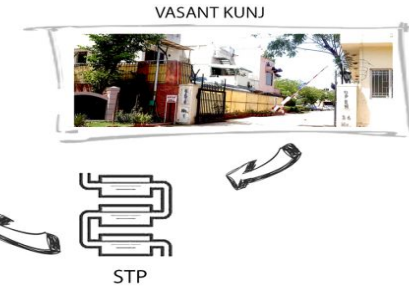
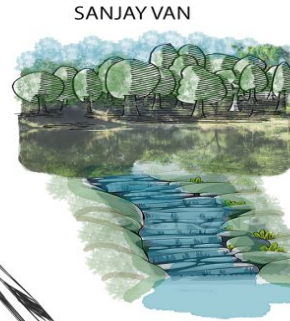
(Image source: <https://www.whatsuplife.in/gurgaon/blog/aravali-bio-diversity-park-gurgaon-location>)

**Department of Regional Water Studies  
TERI School of Advanced Studies, Delhi**



AREA 2: KASHMIRI GATE ISBT AND ANAND VIHAR ISBT

KEY PLAN



AREA 1: VASANT KUNJ

# WATER CYCLE-CIRCULAR ECONOMY



THANK YOU