

ID: 14397

Discipline: MS Civil Engineering

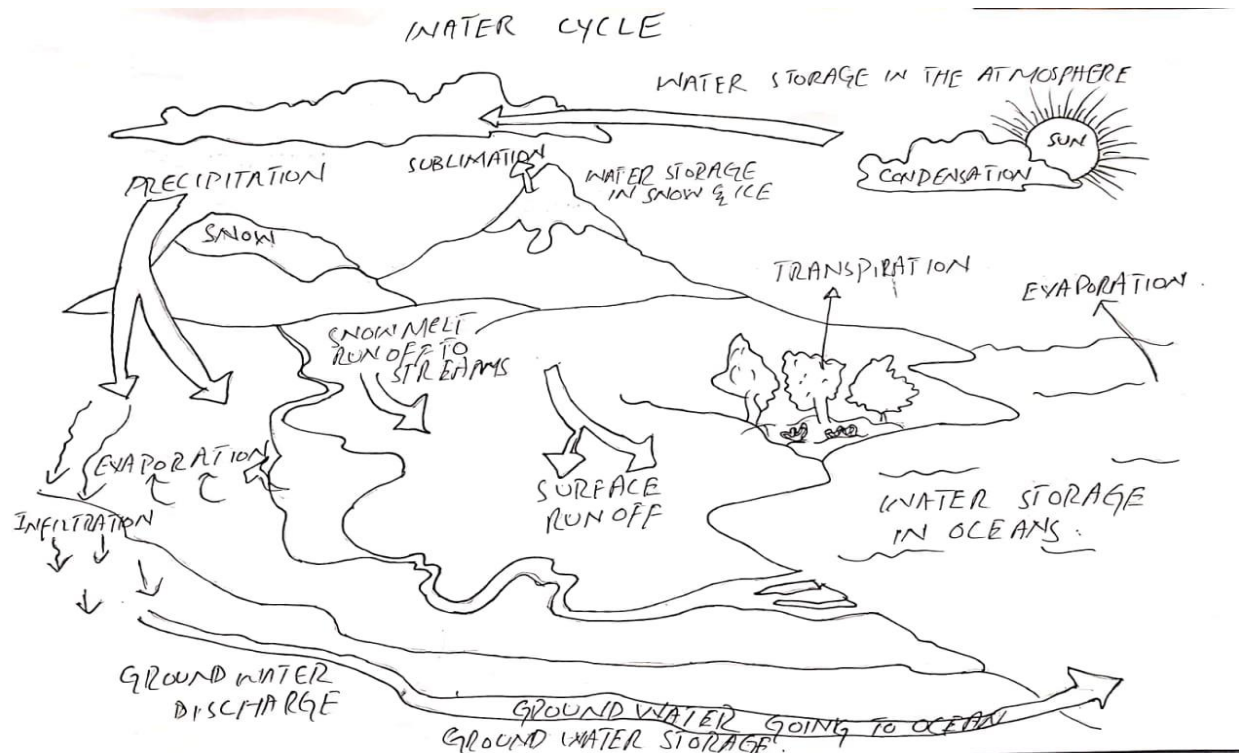
Course Title: Water Demand Supply and Distribution

Course Code: CE- 562

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Q1. What is “**Hydrological Cycle**”? Now-a-days there is general discussion that Hydrological Cycle has been disturbed. Is this a myth or reality? Briefly explain.

Hydrological Cycle is a process in which water evaporates and transpires from oceans, rivers and trees to the atmosphere, where it condenses into clouds and return to earth through precipitation and make their way to oceans, rivers via runoff and infiltration.



Yes, in my point of view Hydrological cycle has been disturbed. It is disturbed due to many reasons. Humans utilize some aspects of water cycle for direct economic benefits. Some actions like deforestation, hydroelectricity, irrigation and greenhouse effect etc have an impact on the hydrological cycle.

Deforestation has a major impact on water cycle. Trees during transpiration release water vapors which causes humidity. These water vapors evaporates and accumulate in the atmosphere and then precipitates in the form of snow, rain or sleet. Deforestation done in an area affects the weather conditions of that area. If trees are cut down, there will be less water for evaporation into atmosphere which results in less rain and it has been observed in a place MUREEE where climate is getting warmer every year due to deforestation and heavy construction.

Irrigation is an artificial way of watering land that does not get water through rainfall. The biggest problem with irrigation system is that it removes water from its natural source and divert it to lands for irrigating, which results in low water level in natural source like rivers etc. Thus irrigation has an adverse effect on hydrological cycle.

Hydroelectricity, now a day's electricity is generated using hydro dams. For this Purpose Rivers are dammed, which results in affecting the function of river at both the streams.

Green House Effect is a natural phenomenon in which earth atmosphere traps a range of gases, which in turn capture infrared rays to keep earth at a moderate temperature. Some activities of human like burning of fossil fuels results in the overall increase of earth temperature. Increase in earth temperature results in increase of evaporation, melting of snow etc that badly affect the earth climate and hydrological cycle.

Q2. Briefly describe “Ground water Sustainability”? How can “Rainwater Harvesting” be linked to ground water sustainability?

Ground water sustainability is the advancement and utilization of ground water resources to meet existing and future use without creating undesirable socioeconomic and environmental impact. Ground water is considered one of the Nations most important natural resources. For a country whose economy depends only on agriculture, ground water play a major role in it.

Continues emission of effluent from industries, domestic sewage, use of pesticides and fertilizers, waste material have very bad impact on ground water sustainability.

Similarly excessive use of ground water and depending only on ground water affects groundwater sustainability. Therefore it is responsibility of community users to utilize the ground water in a sustainable manner and the government should play a role in providing other ways to store rain water.

Rainwater harvesting is a technique in which rainwater is collected in storage tank or infiltration of surface water into sub surface aquifers.

Rainwater Harvesting can be linked to ground water sustainability. It reduces the burden on ground water sources, prevent flooding by collecting surface water in storage tanks, control water logging problems. Harvested rainwater could be used like supply water if it meets the water quality parameters. Combine use of ground water and harvested rain water could be a solution to reduce reliance on ground water.

Similarly harvested rainwater technique can be used to recharge ground water. Water from different rooftops can be collected through pipes and stored. This water can be directed to deep wells to recharge ground water and plays an important role ground water sustainability. Moreover an individual can also collect water on his rooftop during rainy season and store it in a tank for domestic use.

Q3. What “Quality Parameters” should be considered in designing water supply system for a community?

Before the design of water supply system, the source should be taken into account. There are 3 design parameters for the selection of source

- It should be easily approached
- It should be having Sufficient/required quantity of water
- It should be having appropriate quality

Quality of water supply should meet National Environmental Quality Standards (NEQS). There are 32 basic parameters of water quality.

Safe drinking water source should be having all the parameters within WHO specified limits. Water quality refers to chemical, physical, biological characteristics of water. To ensure that water is potable, it must be tested to determine the existence of any impurities.

- Chemical tests
 - a. Total Solids (Ts)
 - b. Hardness
 - c. PH Value
- Physical Tests
 - a. Temperature
 - b. Color
 - c. Taste and Odor
 - d. Turbidity
- Biological properties
 - a. Dissolved Oxygen (DO)
 - b. Biochemical Oxygen Demand (BOD)
 - c. Chemical Oxygen Demand (COD)
 - d. Microorganisms-Bacterial counts

The above all quality parameters should be taken into account before design of water supply system for a community.