Water Demand Supply & Distribution

MUHAMMAD IRSHAD KHATTAK [ID 15514]

Ms TRANSPORTATION

IQRA NATIONAL UNIVERSITY | ID 15514

Q1: (ANSWER)

Water cycle or hydrological cycle of the earth is the sum of all processes in which water moves from land and ocean surface to the atmosphere and back in the form of precipitation.

Water cycle deals with the origin and distribution of water on the globe.

Complex pathways include passage of water from gaseous stage in atmosphere to oceans, lakes, river etc.

PROCESSES:

1. Evaporation

2. Condensation

3. Precipitation

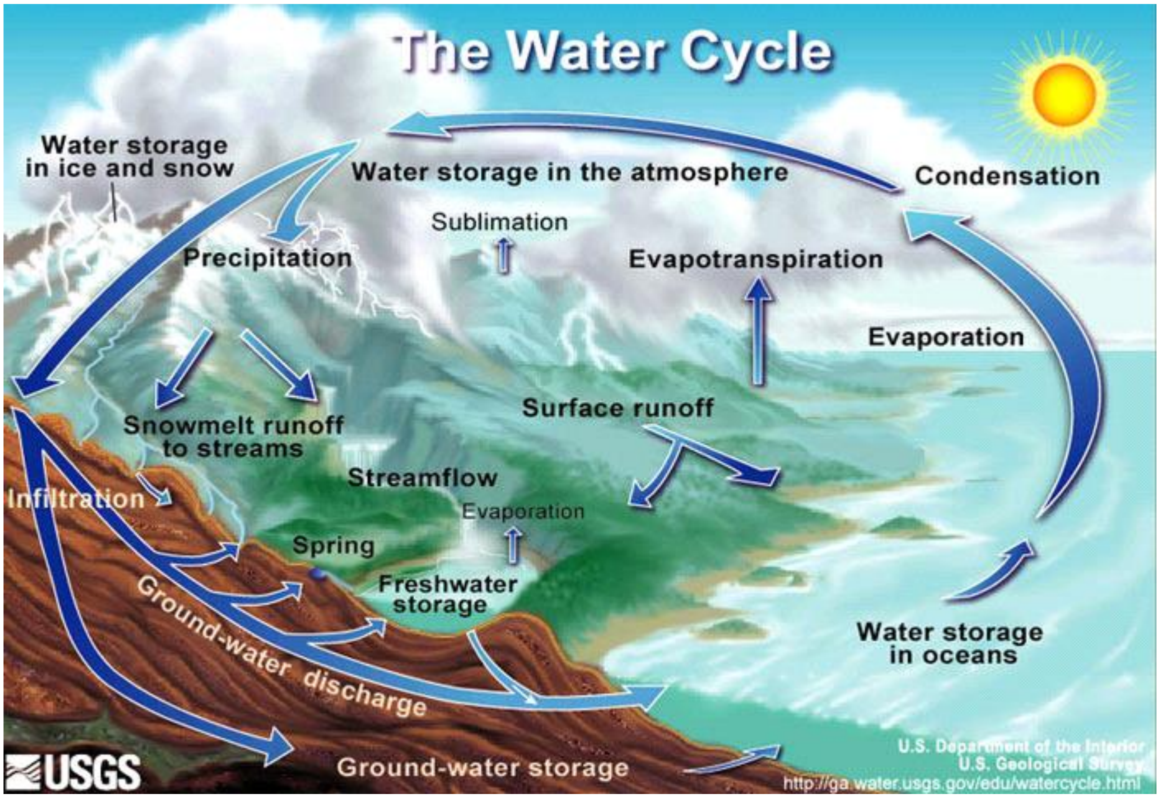
4. Interception

5. Infiltration

6. Percolation

7. Transpiration

8. Runoff and storage



YES WATER CYCLE HAD BEEN DISTURBED ..

Science has shown that climate change touches every corner of our planet's ecosystem, and the water cycle is no exception. Because the processes involved are highly dependent on temperature, changes in one have consequences on the other. Specifically, as global temperatures have steadily increased at their fastest rates in millions of years, it's directly affected things like water vapor concentrations, clouds, precipitation patterns, and stream flow patterns, which are all related to the water cycle.

So how does climate change impact the water cycle? simply, water evaporates from the land and sea, which eventually returns to Earth as rain and snow. Climate change intensifies this cycle because as air temperatures increase, more water evaporates into the air. Warmer air can hold more water vapor, which can lead to more intense rainstorms, causing major problems like extreme flooding in coastal communities around the world.

But it doesn't end there. At the same time that some areas are experiencing stronger storms, others are experiencing more dry air and even drought. Like we mentioned above, as temperatures rise, evaporation increases and soils dry out. Then when rain does come, much of the water runs off the hard ground into rivers and streams, and the soil remains dry. The result? Still more evaporation from the soil and an increased risk of drought.

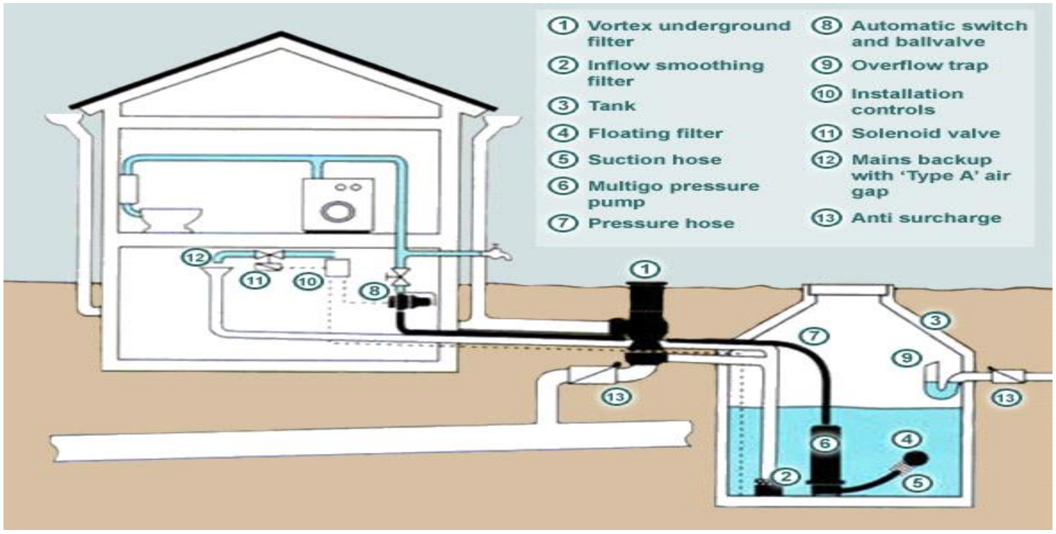
Q2 (ANSWER)

Groundwater sustainability is the development and use of groundwater resources to meet current and future beneficial uses without causing unacceptable environmental or socioeconomic consequences.

Rainwater harvesting and ground water sustainability connection?

Water is considered an everlasting free source that can be acquired naturally. Demand for processed supply water is growing higher due to an increasing population. Sustainable use of water could maintain a balance between its demand and supply. Rainwater harvesting (RWH) is the most traditional and sustainable method, which could be easily used for potable and nonportable purposes both in residential and commercial buildings. This could reduce the pressure on processed supply water which enhances the green living. This paper ensures the sustainability of this system through assessing several water-quality parameters of collected rainwater with respect to allowable limits. A number of parameters were included in the analysis: pH, fecal coliform, total coliform, total dissolved solids, turbidity, NH3–N, lead, BOD5, and so forth. RWH system offers sufficient amount of water and energy savings through lower consumption. Moreover, considering the cost for installation and maintenance expenses, the system is effective and economical.

Schematic of a rainwater harvesting system



Rainwater Harvesting

Rainwater harvesting is a multipurpose way of supplying usable water to consumers during a crisis period, recharging the groundwater and finally reducing the runoff and water logging during the season of heavy rainfall. Traditional knowledge, skills, and materials can be used for this system. During the rainy season, an individual can collect water on his rooftop and manage it on his own. Reserved rainwater on rooftops can be used for self-purposes or domestic use. Water from different rooftops of a lane can also be collected through a piped network and stored for some time. This water can be then channeled to deep wells to recharge groundwater directly, to ponds to replenish groundwater slowly, and to reservoirs to dilute reclaimed water for nonpotable use. Above Figure shows the schematic view of a rainwater harvesting system.

Q3(ANSWER)

Water is the second most important need for life to exist after air. As a result, water quality has been described extensively in the scientific literature. The most popular definition of water quality is “it is the physical, chemical, and biological characteristics of water” . Water quality is a measure of the condition of water relative to the requirements of one or more biotic species and/or to any human need or purpose.

Based on its source, water can be divided into ground water and surface water. Both types of water can be exposed to contamination risks from agricultural, industrial, and domestic activities, which may include many types of pollutants such as heavy metals, pesticides, fertilizers, hazardous chemicals, and oils.

DESIGN OF WATER SUPPLY SCHEME

The future period for which a provision is made in water supply scheme is known as design period. It is estimated based on following:

1.Useful life of system components, wear and rear etc

2. Expandability aspect

3. Anticipated rate of growth population, including industrial, commercial developments and migration etc.

4 .Available resources or funds

5. System performance.