

Subject: Water Demand Supply and Distribution

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Q1. Ans: Hydrological cycle:

The hydrological cycle begins with the evaporation of water from the surface of the ocean. As moist air is lifted, it cools and water vapor condenses to form clouds. Moisture is transported around the globe until it returns to the surface as precipitation of rain. Once the water reaches the ground one of the following two processes may occur

- 1) Some of the water may evaporate back into the atmosphere OR
- 2) The water may penetrate the surface and become ground water.

Ground water either seeps its way into the oceans, rivers, and streams or is released back into the atmosphere through transpiration. The balance of water that remains on the earth's surface is run off, which empties into lakes, rivers, and streams and is carried back to the oceans where the cycle begins again.

Lake effect snowfall is a good example of the hydrological cycle.

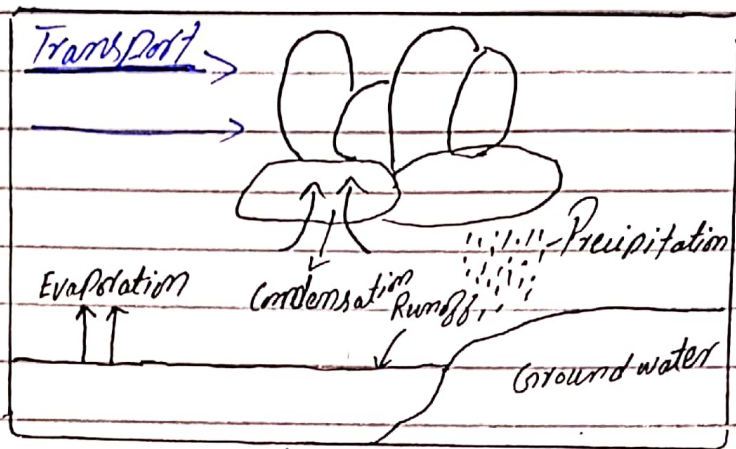


Diagram of water cycle.

In above diagram vertical cross section summarizing the processes of the water cycle that contribute to the production of lake effect snow. The cycle begins as cold wind blow across a large lake a phenomena that occurs frequently in the late fall and winter month around the great lakes. Evaporation of warm surface water increases the amount of moisture in the colder, drier air flowing immediately above the lake surface. With continued evaporation water vapor in the cold air condenses to form ice crystal clouds which transported toward shore.

By the time these clouds reach the shoreline they are filled with snowflakes too large to remain suspended in the air and consequently, they fall along the shoreline as precipitation. The intensity of lake effect snowfall can be enhanced by additional lifting due hills along the shore line. Once the snow begins to melt the water is either absorbed by the ground and becomes

ground water or goes returns back to the lake as runoff.

Lake effect snow events can produce tremendous amounts of snow

→ Keeping in view the above discussion to me it seems a myth that hydrological cycle/water cycle is disturbed and can be changed as it's a natural phenomena.

Q2- Ans: Ground water Sustainability:

Ground water is the water found under ground in the cracks and spaces in soil, sand and rock. It is stored and moves slowly through geological formation of soils sand and rocks called aquifers. It plays a major role in ensuring livelihood security across the world especially in economies that depend on agriculture. Ground water contains mineral ions which slowly dissolve from soil particles sediments and rocks named as dissolved solids. Continuous discharge of industrial effluents domestic sewage uses of fertilizers and pesticides waste dump and over exploitation of resource have badly impact on ground water sustainability. Through over utilization of ground water is the key factor for ground water depletion is loss of base flow other impacts beings severe crisis of safe drinking water and irrigated water. Lastly it is to be mentioned that protection of water resource from depletion is not possible unless the users agree to cooperate and manage the resource themselves in sustainable manner.

Moreover the state also need to play a key role of facilitating and fostering community action for sustainable management.

⇒ "Rainwater Harvesting" is linked to ground water sustainability in the form the rain water is collected in to the natural reservoirs or the infiltration of surface water into subsurface aquifers and this water is then found as ground water sustainability in the form of water found under ground. This is the main ~~link~~ linkage b/w both of the above phenomena.

Q3. Ans.:

Following are "Quality parameters" which should be considered in designing water supply system for a community where we briefly define it one by one in detail below

- 1) water Reliability parameters
- 2) water Quantity parameters
- 3) water Quality parameters
- 1) water Reliability: parameter

water supply system reliability can be define in term of shortages that result from failures of a systems physical components.

A reliability factor for a single failure or for a selected time time period can defined in terms of the capacity lost during failure which is measured as a fraction of the demand

rate or the demand volume. Since the lost capacity is a random variable so is the reliability factor and its probability density function can be derived analytically defined as the probability that a given reliability factor will be achieved can be increased by adding facilities storage pumping capacity pipelines. The least cost combination of facilities can be identified from the cost functions and the probability distributions of the reliability factor.

2) water quantity parameters

water quantity is important parameter of designing water supply system and it means that we have such amount of water present in our storage that we have easily distribute that amount of water to the community for which design it. In simple it means that we have no shortage of water in future for distributing the water for the the design community of people there.

3) water quality parameter

water quality parameters means that water to be tested that is these water is potable (able to drink) or not. water quality parameters

is further more three properties to complete it

- a) Physical properties
- b) Chemical composition
- c) Biological properties

a) Physical properties

It is further depends on the following properties of water

- > Temperature of water
- > Colour of water
- > Odor of water
- > Turbidity of water
- > Electrical conductivity.

b) Chemical composition

It is also depends further more on the following

- > pH of water
- > Total Dissolved Solids (TDS)
- > Anions in water
- > Trace elements in water
- > Hardness of water
- > Salinity of water

c) Biological Properties:

It further depends on the following

- > Dissolved oxygen (DO)
- > Biochemical oxygen Demand (BOD)
- > Chemical oxygen Demand (COD)

The above all is the main parameters to be considered in designing water supply system for a community.

The END