

SOURCE OF WATER



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Water

Much of the ill- health which affects humanity, especially in the developing countries can be traced to lack of safe and wholesome water supply.

Safe and wholesome water

- Free from pathogenic agents;
- Free from harmful chemical substances;
- Pleasant to the test , free from color and odour; and
- usable for domestic purposes.

Water requirement

1. Basic physiological requirement 2 litres per head per day.

The consumption of water, however, depends upon climate conditions, standard of living and habits of the people.

2. A daily supply of 150-200 liters per capita is considered as an adequate supply for all urban domestic purposes.

3. In India 40 liters of water supply per capita per day was the set target to be achieved in rural areas.

4. It must be available close to the people.

Uses of Water

- Domestic use :water is required for drinking, cooking, washing and bathing, flushing of toilets, gardening etc.
- Public Purposes : cleaning streets, recreational purposes like swimming pools, public fountains and ornamental ponds, fire protection and public parks.
- Industrial purposes : for processing and cooling.
- Agriculture purpose : irrigation
- Power production from hydropower and steam power
- Carrying away waste from all manner of establishments and institutions.



Sources of water supply

Three main sources of water :

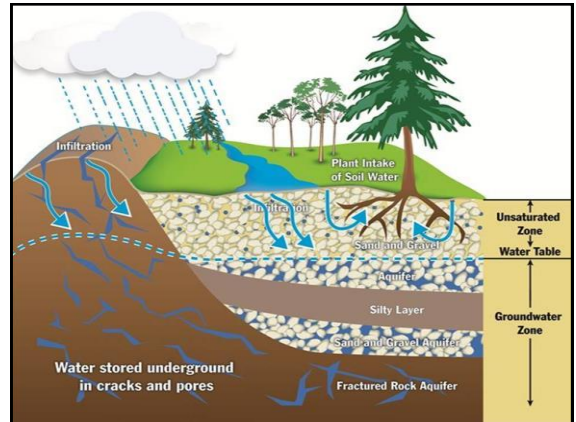
1. RAIN

2. SURFACE WATER

- Impounding reservoirs
- Rivers and streams
- Tanks, ponds and lakes.

3. GROUND WATER

- Wells
- Springs.



1. Rain : -Rain water is the purest water.

- It is clear, bright and sparkling.
- Chemically, it is very soft water containing only traces of dissolved solids (0.0005 percent).
- Being soft, it has a corrosive action.
- Water from clean districts is free from pathogenic agents.
- Tends to become impure as it passes through the atmosphere.
- Gaseous sulphur and nitrogen oxides are emitted from power plants that use fossil fuels.
- Forming dilute solution of sulphuric and nitric acid.

2. Surface Water

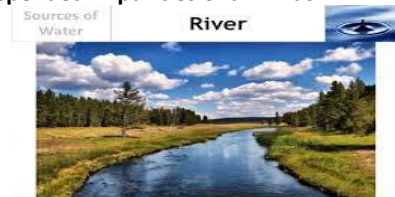
(a.) IMPOUNDING RESERVOIRS

- Artificial lakes constructed usually of earthwork or masonry.
- Cities such as Mumbai, Chennai and Nagpur derive their water supply from impounding reservoirs
- Storing results growth of algae and other microscopic organisms
- Characteristics : fairly good quality of water.
- Usually clear, palatable and ranks next to rain water in purity, is usually soft and considered to be free of pathogenic organisms.
- Impurities : From the catchment area. human habitations and animal keeping or grazing.



(b.) RIVERS:-River water is always grossly polluted and is quite unfit for drinking without treatment.

- Characteristics : Turbid during rainy season.
- It may be clear in other seasons.
- Clarity of water is no guarantee that the river water is safe for drinking. Contains dissolved and suspended impurities of all kinds.



Rivers are important source of water.

Impurities : Rivers are described as a direct connection between the alimentary canal of the people living upstream and the mouths of those below.

self- purification : Dilution, sedimentation, aeration, oxidation, sunlight, plant and animal life but these agencies are not sufficient to render the water potable.

Needs purification before it can be used for drinking

(C) TANKS

- Large excavations in which surface water is stored.
- Tanks are recipients of contamination of all sorts.



Improvements of tanks :

- The edges of the tank should be elevated in order to prevent the entry of surface washings.
- There should be a fence around the tank to prevent access to animals.
- No one should be permitted to get into the tank directly
- The weeds should be periodically removed and
- The tank should be cleaned at the end of the dry season.
- simplest solution consists of subjecting the tank water to some sort of sand filtration.



Sea Water

3. Ground Water

1. It is likely to be free from pathogenic agents;
2. it usually requires no treatment;
3. the supply is likely to be certain even during dry season; and
4. It is less subject to contamination than surface water.
5. High in mineral content, e.g., salts of calcium and magnesium which render the water hard
6. it requires pumping or some arrangement to lift the water.
7. The usual ground water sources are wells and springs.

Wells

1. Shallow wells : Important source of water supply. Water from above the first impervious layer in the ground.

2. Deep wells : which taps water from below the first impervious layer in the ground.

-Deep wells furnish the safest water.

-Most of the wells in India are of the shallow .

-Liable to pollution from neighboring sources

3. Artesian wells : are a kind of deep wells in which the water rises above the level of ground water. Not common in India.



4. Step wells :

Becoming obsolete . The open dug wells and step wells are a health hazard to the community.



Wells may also be classified, according to the method of construction, into

- (1) Dug wells and
- (2) Tubwell

DUG WELLS

- (a) The unlined katcha well and
- (b) The masonry or pucca wells

Improvement of dug wells may be made sanitary

SANITARY WELL

one which is properly located , well-constructed and protected against contamination with a view of yield a supply of safe water.

1. Location :

- Well should be located not less than 15 m (50 feet) from likely sources of contamination.
- At a higher elevation with respect to a possible source of contamination.
- No user will have to carry water for more than 100 m (100 yards).

2. lining :

- Should be built of bricks or stones set in cement up to a depth of at least 6 m (20 feet). -
- Lining should be carried 60-90 cm (2-3 feet) above the ground level.

3. Parapet wall : parapet wall up to a height of at least 70-75 cms (28 inches) above the ground.

4. Platform :

- Extending at least 1 m (3 feet) in all directions.
- Gentle slope outwards a drain built along its edges.

5. Drain : Pucca drain constructed beyond the “cone of filtration”

6.covering : the top of the well should be closed by a cement concrete.

7.Hand-pump : should be equipped with a hand- pump

8.Consumer responsibility : Strict cleanliness should be enforced in the vicinity of the well; and buckets from individual homes should not be used.

9.Quality : quality of water should conform to quality of safe and wholesome water.



TUBE WELLS

-Source of drinking water in many parts of India.

-Shallow tube wells or “driven wells” largest individual source of water supply to the rural community.

- Pipe (usually galvanized iron) sunk into the water- bearing stratum and fitted with a strainer at the bottom, and a hand-pump at the top.

-The areas within 15 m of well should be kept free from pollution with liquid and solid wastes.

-Deep tube wells or bored wells are sunk by drilling through successive substrata of gravel or rock until a suitable supply of ground water is located.

-They may be several hundred feet deep and require complicated mechanical drilling equipment.

-Chandigarh ,derives its entire water supply from tube wells





SPRINGS

water comes to the surface and flows freely under natural pressure,

Two types-

- 1. Shallow springs and
- 2. Deep springs.

-Shallow dry up quickly during summer months,

-Deep springs do not show seasonal fluctuations in the flow of water.



Thanks

