

Water : The Elixir of Life and Wonderful Gift

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Water : The Fountain Head of Life

What is water? The simple answer to this question is that water is the simplest chemical of kitchen. Water (O.E. water, Ger. Wasser, Gr. hydor, L. udus, Sans. udan) is, in fact, natural most abundant and the most useful compound. For the growth and development of life support system, it is absolutely essential to make water available in the acceptable quantity, quality and at the required time and place. The Earth appeared like a precious blue stone set in the blackness of outer space to astronauts for the first time. If inhabitants of other solar systems were to visit this lovely, cool, blue planet of ours, they might just call it "Aqua" rather than "Terra" because of great abundance of its most unique feature - liquid water in streams, rivers, lakes and oceans. Therefore, earth is popularly called as "blue planet". The colour blue denotes the presence of water which covers 71 per cent of our earth's surface. Since water covers 3/4th of our planet, it is readily available, yet water is one of earth's most precious resources. Different kinds of physico-chemical processes occur in solutions comprising water as the solvent. The simple molecule, H_2O , aggregates to the liquid state water which is the basic requirement for sustaining life.

Distribution of Water on Earth

Millions of years ago life evolved in water and water became a basic component of every

living cell. Although water covers over three-quarters of the surface of the Earth, 97 per cent of this water resource is the oceans and is salty. The glaciers and icecaps lock away another two per cent (Table-1). Even less than one per cent is the fresh and usable water of lakes, ponds, rivers and ground-water. Freshwater is, therefore, a treasure to protect and conserve. Freshwater is precious not only because we need it to live, but also because only about three per cent of all the earth's water is directly usable. Of this only about 0.26 per cent is available as freshwater for people to use. Water is used for various purposes like agriculture, livestock, industry and power generation and municipal and rural water supplier (Table-2).

Sources of Water

There are two important sources of water such as (a) Surface water and (b) Underground water. The surface water includes the sources like (i) Rain water (ii) River water (iii) Lake water and (iv) Sea water. The Sources of underground water are (i) Spring water and (ii) Well water found in lakes, rivers, reservoirs and shallow ground water sources, this small amount of water is continually renewed by the restless and endless movement of water in the global cycle in its various forms, viz, ice, water vapour, rain drops and snow. This constitutes the "hydrological cycle".

Table 1 : Water resource by distribution

Sl. No.	Water Source	Water Volume in cubic miles	Per cent to total water
1.	Oceans	317,000,000	97.24
2.	Ice caps, Glaciers	7,000,000	2.14
3.	Ground water	2,000,000	0.61
4.	Freshwater lakes	30,000	0.009
5.	Inland sea	25,000	0.008
6.	Soil moisture	16,000	0.005
7.	Atmosphere	3,100	0.001
8.	Rivers	300	0.0001
Total Water		3,26,000,000	100

Source : Nace, U.S. Geological Survey, 1967.

Table 2 : Percentage use of water

Sl. No.	Activity	Percentage of use
1.	Agriculture	93.37
2.	Livestock	1.08
3.	Industries and Power generation	1.26
4.	Municipal and Rural water supplies	3.73
Total		99.44

Source : Science Reporter, June, 2004.

In this awesome cyclical engine, water is moved constantly among the aquatic, atmospheric and terrestrial compartments driven by solar energy and gravity. Apart from this, the knique physical and chemical properties of water bear a direct impact on the globe's surface temperature, the atmosphere, and the interactions of life forms with their environment. Precipitation in the form of rain, snow, hail, dew and frost forms the ultimate freshwater resource within a river basin and is partitioned between the "green" and "blue" water flows. The three most important security dimensions of water, food and ecology are closely linked together by the movement of water in the hydrological cycle.

Necessary of Water

Since the birth of river basin civilizations, human societies have been developing technologies for capturing, storing, cleaning and redirecting fresh-water resources to meet their needs. Different kinds of structural solutions to supply irrigation water in fields, control of flood and generation of power and electricity have been in operation in our country since independence. Humanity today has been trying hard to reach the twin goals of human and ecological security. The former includes easy access to safe domestic water, food and environmental security with effective protection from flood and drought. The latter implies the long-term protection of the goods and services that we get from nature and the preservation of the delicate life-support system. However, water is required essentially for the satisfactory performance of the following.

- (i) Various life process for sustenance
- (ii) Circulatory fluid.
- (iii) Carrier of nourishing food and micronutrients
- (iv) Removal of product of wastes.

Water is regarded as the origin and sustainer of life and held so sacred by the most ancient races for which it is worshipped as God. Natural water for animal body and human in particular acts as (i) Tonic (ii) sedative (iii) Analgesic (iv) Spoliative (v) Diaphoretic (vi) Diuretic (vii) Eliminative (viii) Antipyretic (ix) Expectorant (x) Emetic (xi) Anacsthetic (xii) Haemostatic. According to Knipp, the father of modern hydrotherapy, water dissolves, removes and strengthens which are three basic and principal attributes of water.

Purified Water for Life

Water the nuclers for life support systems on earth. Unfortunately today the drinking water

is not safe because of various anthropological activities and population pressure. The burgeoning human population and the demands for the various consumptive uses of water is creating a severe stress on the water resources of our planet with increasing water shortage and rising water quality problems in many parts of the world, ensuring universal access to safe, sufficient and affordable water for all remains is an enormous challenge. Industrial effluents, human abuse and misuse and overuse of chemicals, pesticides, dyes and detergents are the important sources of pollutants. The possible impurities are basically of (i) physical (ii) chemical and (iii) organic type (table 3).

Table - 3 : Possible impurities in water

Sl. No.	Category of impurity	Specific impurities
1.	Physical	Disagreeable colour, colour, taste, turbidity - floating and suspended impurities.
2.	Chemical	Mineral constitutes rocks like bicarbonates, carbonates, sulphate, chloride, fluoride, sulphide, oxide, lead, orsenic, nitrite and nitrate etc. and pesticide residues.
3.	Organic	Traces of vegetable and animal matters producing bacteriological agents which cause water borne diseases.

Table 4 : Method of removal of impurities from water

Sl. No.	Nature of impurity	Method of removal of impurity
1.	Floating matter	Screening
2.	Suspended impurities	By redimentation with the help of coagulants and decantation.
3.	Micro organism and colloidal matters	Filtration through sand filters, carbon filters, microu filters or reverse of mosis.

4. Pathogenic microbes (Bacteria) Disinfection by boiling, by chlorination, by potassium permanganate and by ultraviolet light.

Since impurities are harmful for human body, purification is necessary to make the water safe for human consumption. The drinking or potable water, fit for human consumption should satisfy the following essential requirements.

- (i) Water should be sparkling clear and odourless.
- (ii) It should be pleasant in taste.
- (iii) It should be perfectly cool, reasonably soft and its turbidity should not exceed 10 ppm.
- (iv) It should be free from objectionable dissolved gases like hydrogen sulphide.
- (v) It should be free from objectionable minerals such as orsenic, lead, mercury, manganese (particularly heavy metals).
- (vi) Its alcalinity should not be high nor the water should be highly acidic. The pH value should be maintained between 6.5 to 8.5.
- (vii) Its total dissolved solids should be less than 200 ppm.
- (viii) It should be free from disease-producing (Pathogenic) micro-organisms.

Method of Purification of Potable Water

A sound and disease free health needs safe drinking water apart from proper food substances. Impure water may be purified in following procedure (Table 4). different methods may be followed to remove different undesirable materials present in water. However, purely demineralised water is neither tasty nor potable. Certain minerals present in water are helpful for maintaining good health. Thus the organisations like WHO and BIS have prescribed the optimum

level of essential minerals to be maintained in purified drinking water.

Water for Sustainable Future

Water is everybody's property and business. Ways of managing our water today should be taken up enthusiastically. This would mark a comeback to our origins where simple, well-planned, innovative and local methods are employed to revive this natural gift from daying on unnatural death. A gradual consensus is growing among scientists, water planners, governments and civil society that new approaches need to be adopted within the next two decades to avoid calamity. The supply, use and handling of our precious water resources will have to be integrated across sectors and between regions sharing the same resource.

Repeated occurrences of water shortages can only be averted if a comprehensive water management strategy is worked out. The Government, private organisations, schools and mass media could play a positive role by educating the public to use water wisely, recycle and not to waste the water resources. Environment and water education should be available to men and women in all parts of the country. Recycling and reclamation concepts need to be promoted strongly to increase available water supply and break the population-water paradox. It is time, therefore, to plan for meeting our present and future needs with the water that nature has made available to us to determine what desires can be satisfied within the limits of that resource and to ensure that the natural ecological cycles are preserved. It is our duty to remember "World Water Day" which is observed on 22nd March every year which, in fact, reminds us to preserve the natural resource with appropriate use. Proper

use, care and consciousness for water would certainly develop a sustainable green and blue Earth. We should rightly remember that "Water is the elixir of life" for which right care and share is desirable.

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The elixir of life, also known as elixir of immortality and sometimes equated with the name philosopher's stone, is a potion that supposedly grants the drinker eternal life and/or eternal youth. This elixir was also said to cure all diseases. Alchemists in various ages and cultures sought the means of formulating the elixir. The concept originated in ancient India or China where the concept preceded that in Europe by millennia.