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**Dr. Anil Kumar Saini**  
 Assistant Professor & HOD,  
 Department of Chemistry, Dr.  
 Mohanlal Piramal Girls (PG)  
 College, Bagar, Jhunjhunu,  
 Rajasthan, India

## A systematic analysis of distribution and sources of various types of water on the earth

**Dr. Anil Kumar Saini**

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### Abstract

Water is essential part of nature because in nature all types of mechanism are proceeds by the use of water. It is a chemical substance which is made of by the chemical reaction of hydrogen and oxygen. It's molecular formula is H<sub>2</sub>O with tetrahedral geometry. It is found in mainly three different physical state i.e. solid, liquid and gaseous state. Solid state is found as ice, liquid state is present as water and gaseous state is found in vapour form. These physical form of water are distributed in surroundings as oceans water, ground water and surface water. Oceans water is non-drinkable due to the presence of high concentration of salts containing Ca<sup>2+</sup>, Mg<sup>2+</sup>, Na<sup>+</sup>, K<sup>+</sup> etc. There are many sources of water on earth like oceans, springs, well, gysers, artesian well, lakes, rivers, rain, snow fields, glaciers etc.. It is very necessary to know about the distribution and sources of water on earth so that we can usefully utilize and manage the very important part of nature i.e. water.

**Keywords:** Dispersion, iceberg, glaciers, aquifer, continent, snow fields, springs

### Introduction

Water is the most common liquid on our planet, vital to all life form. It is the dispersion medium for all biochemical reaction of the living process & takes part in many of these reactions. Water quality refers to the chemical, physical & biological characteristics of water. It is a measure of the condition of water relative to the requirements of one or more biotic species & or to any human need or purpose. The most common standards used to assess water quality relate to health of ecosystems, safety of human contact & drinking water. Mostly chlorides, fluoride, carbonate, bicarbonate, nitrate & phosphate anions are present. Cations like Ca<sup>2+</sup>, Mg<sup>2+</sup>, Na<sup>+</sup>, K<sup>+</sup> and anions like Cl<sup>-</sup>, F<sup>-</sup> are present in the underground water of the earth. Both cations & anions present in the earth are equally responsible to maintain the quality of water.

The quality of water is continuously changing as a result of nature & human activities during last decade this is observed that water get polluted drastically because of increased human activities. Water today defines human social & economic developments. Water resource management is an important parameter for development of any nation as it is directly related to the development & growth of the economy. Because of rapid growth of urban area, domestic & irrigation uses, prolonged discharge of industrial effluents, domestic sewage & solid waste dump, water quality & water quantity has been affected very badly. The surface water resources continue to be contaminated with runoff water from agricultural fields containing pesticides, fertilizers, soil particles, chemical wastes from industries, sewage from cities & rural areas, most of Indian rivers are polluted & National River Conservation Directorate (NRC) has launched action plan for several rivers.

Water is distributed in nature in different forms, such as rain water, river water, lake water, sea water, ground water etc. The rain water, however, is associated with dissolved gases such as CO<sub>2</sub>, SO<sub>2</sub>, and NH<sub>3</sub> etc. from the atmosphere. The rain water when reaches to ground, gets percolated in soil and becomes underground water. Generally, underground water is clear and colourless, but when water seeps down the ground, it dissolved inorganic salts. Pollutant removal in drinking water may only involve techniques adopted in governmental regulations, such as flocculation, filtration, sterilization, and conservation procedures to which have been added chemical treatment techniques involving a limited number of chemicals, mostly stable precursors for hydroxyl radical production. Fluorosis is the worldwide health problem and is

**Corresponding Author:**  
**Dr. Anil Kumar Saini**  
 Assistant Professor & HOD,  
 Department of Chemistry, Dr.  
 Mohanlal Piramal Girls (PG)  
 College, Bagar, Jhunjhunu,  
 Rajasthan, India

affecting both the developing and developed countries. In the whole world, about 25 countries have high fluoride concentration in ground water.

Rajasthan is the worst affected state in India. Aluminum salts are commonly used as coagulants in water treatments. Aluminum fluoride is less toxic than other fluorides.

### Distribution of water

In water sphere near about 1318120000 Km<sup>3</sup> water is present in various direction of atmosphere. Nearly 77.23% water is present in the form of Ice caps, 2.6% water (36020,000 Km<sup>3</sup>) is present as fresh water, Icebergs and glaciers while 22.41% water is present as ground water at 4.0 km deep in the earth. Thus on the earth water is distributed in following types-

1. Ocean's water
2. Ground water
3. Surface water

#### 1. Ocean's water

Nearly 71% parts of earth is present as water and it's 97.39% part is available as ocean water. Nearly 1,34,80,000,00 km<sup>3</sup> water is present in ocean. Due to the largest quantity of water oceans are called water planet. But ocean's water is not useful for drinking purpose because it is highly salted.

#### 2. Ground water

The water present under the ground into the mountain's hole and cracks is known as ground water. It's quantity is controlled by rain quantity and speed, temperature, dryness of air, absorption capacity of soil. The percentage area of ground water is only 0.58% with respect to the total water resources while 22.21% of total pure water only 2.67% pure water is present on the earth. The ground water is present at 4km deep in the earth. Because the ground water is present under the ground so it is also called subsurface water. The name subsurface water is given to ground water because it is present under the surface of the earth.

### Storage of ground water

Ground water is storage under the earth in following three zones

#### 1. Non-saturated zone

The upper part of ground water is called non-saturated zone. Since air is present in this zone hence it is also called zone of aeration. In this region water is present in only rainy season.

#### 2. Saturated zone

It is the mediatory zone of ground water. In this zone water comes from non saturated zone through link aging so water level increase in this zone. In saturated zone the water level is very high in Rainey season while very low in dry season. The middle part of above both levels is known as intermittent zone of saturation. While under this zone a specific saturated zone is present which is called zone of permanent saturation which remains always saturated. Saturated zone is also known as preatic zone.

#### 3. Rock flowage zone

Under the ground surface a specific region is present where rock hole is closed due to the increase of rock weight hence

water does not seeps down. So water is storage here. This stored water is known as Aquifer. Aquifer water is present at 16km deep in the earth.

### Surface Water

The water present on the surface of the earth is known as surface water. It is present in both stable and mobile forms. Surface water basically distributed on continent part. The 2/3 part of surface water is present on Antarctica continent surface water is present on continent in the form of Ice. Ice covered areas are known as snow fields and glaciers. The part cited above snow line which covered always Ice is called snowfields. While a huge mass of Ice cited above snow line and remains labile due to the graviting force is called glaciers.

### Sources of water

#### Sources of ocean water

##### 1. Pacific Ocean

It is the largest water part of earth which covered 1/3 part of earth. Its coverage area is 165384000 km<sup>2</sup>. Nearly 53.9% water of the world is present in Pacific Ocean. Its water has very high concentration of salts.

##### 2. Atlantic Ocean

It is the second largest water part of the earth which covered 8.2 crore km<sup>2</sup> part of the earth. The world's 24.9% water is present in Atlantic Ocean. Its water also has high concentration of salt.

##### 3. Indian Ocean

It is the third biggest water part of the earth. The total 21.1% water of the world is present in the Indian Ocean. It's water is also highly salted.

### Sources of ground water

The main sources of ground water are following as-

#### 1. Springs

The part of ground water which removes through a natural hole is called springs, springs are moving according to structure of rock layer. Rainy water is grounded by linkaging through permissible rocks. But when in transmission path, the non-permissible rocks are present then water does not move towards down but moves up through the non-permissible rocks hence this water comes on ground in the form of springs.

- **On the basis of the stability of water springs are following two types:-**

**A. Permanent springs:** - These are formed by the unique slope of rocks under the ground surface.

**B. Temporary springs:** - These are formed by the changeable slope of water layer.

- **On the basis of nature of water springs are following types:-**

**A. Common springs:** - These are the simple deep springs from which pure, cold and drinking water obtained.

**B. Thermal springs:** - These are high deep springs from which hot water obtained.

**C. Warm springs:** - These are very deeped springs. It's temperature is greater than boiling point.

**D. Mineral springs:-**These springs are found in volcano region from which sulphur salted water obtained which is medicinal used.

## 2. Well

To obtain the water from joint water region cited underground wells are digging in permissible rocks. Wells are filled with water because there unpermissible rocks are present under the wells.

## 3. Artesian well

Artesian wells are the natural water resources in which water present without any help. For the formation of Artesian well there are required synclinal structure and monoclonal structure. The zone from which the water of artesian well comes towards upper side is known as aquifer. For the formation of aquifer there are impermissible shell are present up and down with respect to aquifer which's nature may be similar to aquiclude.

## 4. Geyser

According to haumes- "Geyser are the sources of hot water from which hot water and vapour fastly at certain time interval".

**Sources of surface water:-**There are following main sources of surface water:-

1. Lakes
2. Rivers
3. Snow fields
4. Glaciers

### 1. Lakes

It is the main sources of surface water. These have 0.017% water of earth. According to quality of water lakes are different types likes salted lakes, non-salted lakes (Pure lakes) and Ice lakes etc.

### 2. Rivers

The water body which flow in a certain path on earth is known as river. When Rainey water moves in a certain path from upper side to down side due to gravity force then this flow of water is known as rivers. The flow of river is controlled by intensity of rainfall, total rain, shape and area and surface of drainage basin.

### 3. Snow fields

Surface water also consumed as snow fields. These snow fields are the origins of many rivers. Due to the increasing of temperature these snowfields are melts and convert into rivers.

### 4. Glaciers

A huge mass of Ice cited above the Ice line is known as glaciers which may be labile by the accumulation and compaction of Ice above ice line.

## National Water Policy-2002

National water policy is prepared by National water resources council (NWRC) and implemented on 1<sup>st</sup> April 2002. It forces on the institutional management and development of water resources and the formation of "river Basin organization". It determined the preference as follow.

1. First priority- Availability of water for all human beings.
2. Second priority- water management for agriculture.
3. Third priority- Availability of water for electric production.

4. Fourth priority- for the ecological balance flow of water in the rivers.
  5. Fifth priority- uses of water for industries and transport.
- **The important characteristic of national water policy are following as-**
    1. To stabilized the organization and units that determine the maximum and desirable uses of water resources in country.
    2. To prefer the cyclisation and reuses of water.
    3. To make organizational management at national and state level for the certainty of protection of water resources and other infrastructure.
    4. For the development of water resources to provide regular and good managed training.
    5. To prepare a master plan for the management and controlled of food.
    6. To manage the regular checking of the quality of surface and ground water.
    7. To examined the ground water resources by scientific method.
    8. To manage the water for water deficient region from water excess region.
    9. Identification and classification of water excess region in the country.
    10. To educate the people for water conservation.
    11. To organized the water conservation programmer.
    12. To determine the preference in regulation, development and uses of water resources.
    13. To preferred the availability of pure drinking water.

## Environmental Research Laboratory (ERL)

It is Authorized institute of India for the testing of water quality. The authority of water testing is given by controller and auditor general (C.A.G) of India. The head office of ERL is located in Lucknow. Tested water is classified in five categories by ERL which are following as-

Category	Specific Characteristic
A	Suitable for drinking
B	Suitable for bathing and swimming
C	Suitable for drinking after primary treatment
D	Suitable for wild animals and fishes
E	Suitable for agriculture, industrial cooling and waste disposals.

## Conclusion

Water resources were the maximum exploited herbal system considering man stored the Earth. Due to the rapid growth of population, increasing living requirements of human beings and industrialization there are an extra demand of first-class water whilst alternatively gradual growing of pollutants in water assets. The maximum residing cells of living being contain the quantity of protoplasm about 80% water i.e. about fifteen hundred million kilometers in the hydrosphere, approximately 95% quantity of it available in sea water, 4 % value of it is found as snow in mountains and cold areas, and only 1% is available for human being. According to water bureaucracy nearly 99% quantity of floor water is present in rivers, lakes, soil profile, and ecosystem. It's far generally identified that the quantity of groundwater is not lies in satisfactory condition due to its critical amount. The movements of particles of groundwater behave likes solutions due to the presence of lot of salts in it which are derived from the pollution. The great delivery of groundwater based on its purpose. Therefore, the desires for

various type of water such as ingesting, business and irrigation water varied broadly. For the establishment of good standards quality of water there are required to measures the specified chemical and radiological ingredients of liquid. Beside this, a lot of specific methods are given for reporting and evaluating outcomes of water evaluation. All results of evaluation indicate that the unrecognized level of dissolved gases in groundwater can pose risk for survival of living beings. The main advantageous for water delivery and industrial functions are uniform situation of temperature related to groundwater. Since in floor water inorganic salts remains in dissolved condition so it poses the qualitative supply of ingesting water. When such dissolved inorganic salts containing lead and arsenic minerals seeped into the water than it becomes additionally toxic. In the latest years a few regions of the world contains expanded amount of pollutant which caused significantly threatened in quality of drinking water.

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