



# Water Contamination and Human Health

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## Introduction

Water which is considered the basic rule of life can be a danger to human health when exposed to contamination, it becomes in this case a mode of transmission of diseases, and the transmitted diseases by drinking water are usually in the form of Pandemic Outbreak infects a large number of people. Therefore, control of drinking water safety is considered more importance than the control of food safety, due to the widespread and daily consumption of drinking water.

## Water Contamination

One of the earliest studies that scientists and researchers were concerned on was the water contamination. Thus, it is expected that more research and studies will be handling this kind of contamination as opposed to other types. This is because water is involved in all biological and industrial processes, and as well no living creature (animal nor plant) can survive without water. Cell biology has proved that water is the most essential component in the structure of the cell. It is also the basic construction unit in all living creatures. Biochemistry has also illustrated that all the interactions and transformations taking place inside the bodies of living creatures could not have been possible without water. This is because water is either mediator, catalyst, or an income/outcome of any chemical reactions. Physiology has also proved that water is vital for each organ to be enabled to carry out its jobs without which it could have never survived. That is equal to the holy verse, which announces that God create all living from water.

## Sources of water contamination

Water is contaminated when its natural features are changed or spoiled due to being exposed to chemical, physical or bacteriological contaminants. In this case, it becomes unfit for either human beings, animals, plants or aquatic creatures. Water turns contaminated when dumping of human, animal, plant or industrial waste in it. Also the ground water becomes contaminated when waste water with all its contaminants leaks into it, and the following are the most important sources of water contamination:



### 1. Rain Water Contamination

God is merciful and generous, has graced us with rain water with no impurities, so pure and with high qualities till it touches the surface of the earth.

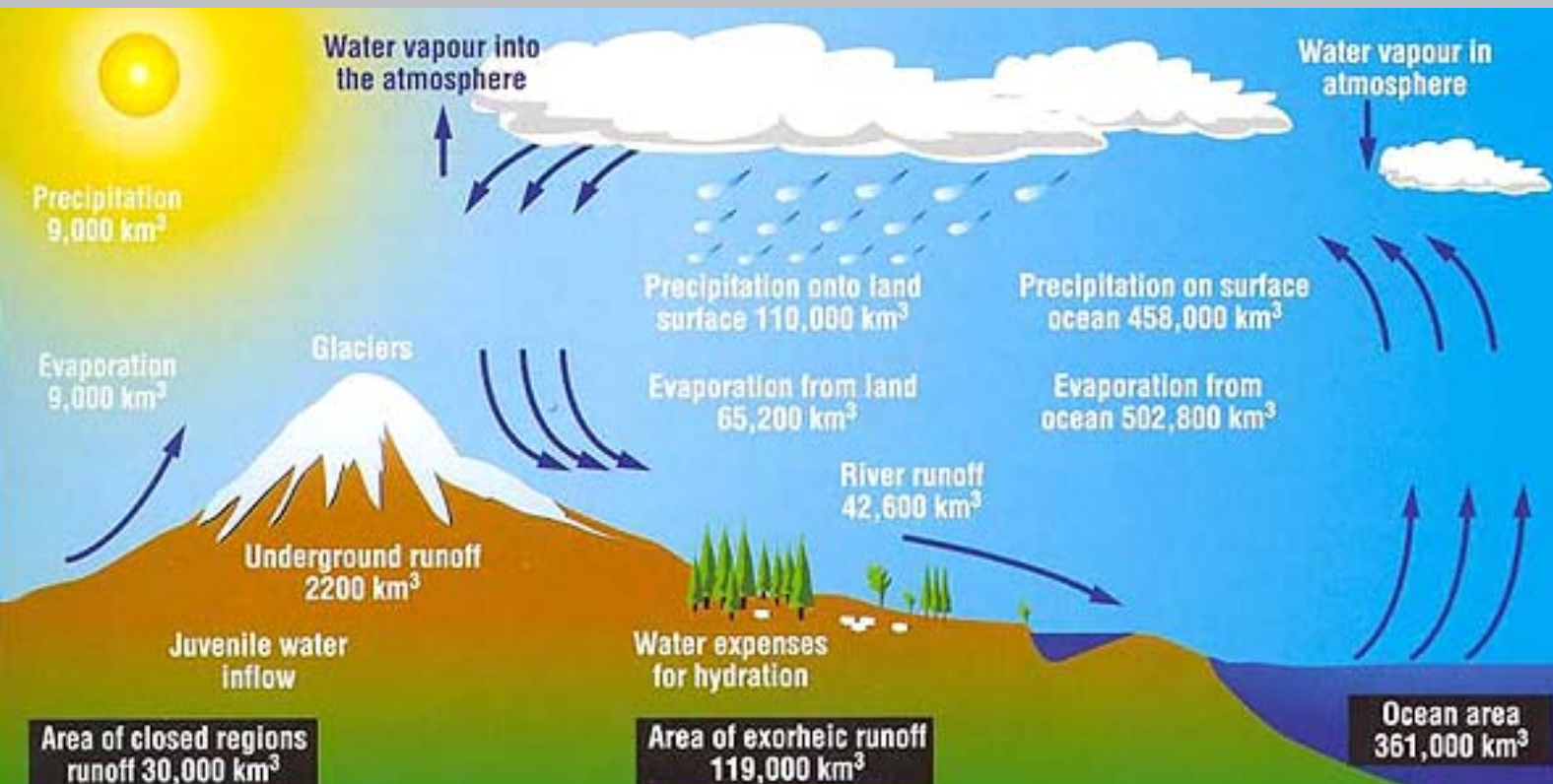
At the beginning of its formation, rain water is pure, but we have insisted not to keep it that way. We filled air with solid and gas contaminants which are blown by smoke emitted from industries, and vehicles. Rain water melts down these contaminants which fall down, along with snow, to be absorbed by the soil thereby adding extra contaminants to those already found within the soil. All the different parts of a plant absorb those harmful contaminants. Humans and animals that feed on such plants consequently get of hurt. Also, the downfall of polluted rain water on bodies of water will cause contamination leads to poison of all living creatures within.

### 2. Wastewater

Waste water, also known as sewage water, gets contaminated with soap, industrial detergents and some types of harmful bacteria and microbes. Oceans and rivers become contaminated once the sewage water flows into them. Also, when sewage water seeps underground, it causes pollution of the ground water.

### 3. Industrial Waste

Industrial waste includes all the waste that food, chemical, metal and synthetic fibers factories produce. These wastes pollute water with fats, bacteria, acids, alkaline, paints, oil, and chemical compounds and poisonous acids such as mercury and arsenic, and also include heavy metals such as lead and cadmium.



#### 4. Nuclear Reactors

Nuclear reactors cause thermal pollution that severely harms the marine environment with a possibility of producing a radioactive contamination which causes the extinction of marine creatures exposed to it, and also it cause harms to humans and other creatures.

#### 5. Oil spill to the sea and oceans

Ocean and sea water becomes contaminated as a result of the almost yearly accidents of sinking oil carriers, aside from the cleaning operations done by other ships when they wash their tanks and drop their refuse water into the sea.

Sea water also becomes contaminated with oil during the drilling at the bottom of the sea. Back in the 1960s, an oil spill 800 miles long was formed when such a thing happened of the coast of California in the United States. That incident led to the death of enormous numbers of seabirds, dolphins, fish and other marine creatures.

#### Water and Human Health

The relationship between humans and water can be represented by the transmission of infectious diseases

or some health problems caused by the lack or increase of certain chemical elements, or as a result of presence chemical contaminants in the water. This can be illustrated as follows:

#### The First Case:

Transmission of infectious diseases, where Water, which is contaminated with harmful bacteria, plays an important role in that transmission of diseases. The lack of safe water for drinking purposes and other house needs can cause different kinds of gastrointestinal diseases such as diarrhea, cholera, dysentery, etc.... More incidence of these diseases in any community related to the lack of safe drinking water. Thus, communities suffering from lack of water will mostly have low health level with spread of diseases.

#### The Second Case:

Health damages, as a result of increase or decrease in the concentration of certain chemical elements and organic/inorganic compounds in water. This can be limited as follows:

## 1. Lack of Essential Elements:

- Lack of iodine in water and food leads to goiter, and iodine deficiency in the pregnant women leads to the brain damage and nervous system of the fetus.
- Lack of fluorine in water and food leads to the weakness in the growth of bones and teeth of children.
- Lack the concentration of sulfate and carbonate of calcium and magnesium in water cause weakness in tissues of the body and relaxation of the heart muscle.
- Lack of chromium in water and food leads to Juvenile Diabetes, but this phenomenon is still under research.

## 2. Harmful Organic Compounds:

- Some organic compounds that form in water as a result of the reaction of organic materials with halogens can cause cancerous diseases for humans. Some researches were applied on certain organic compounds such as trihalomethanes (THMs) and Polynuclear Aromatic Hydrocarbons (PNAHCs) have proved that these compounds can cause cancer when its concentration increase in the body. The World Health Organization (WHO) proposed that the concentration of such compounds should not exceed 200 Nano-grams/liter in drinking water.
- Babies, who depend on milk dissolved into water, will suffer Methaemoglobinaemia (Blue baby disease) if the concentration of nitrate NO<sub>3</sub> exceeds 45 milligrams per liter of drinking water.

## 3. Harmful Chemical Elements:

This includes

- The maximum limit of Arsenic, Cadmium, Cyanide, Lead, Mercury and Selenium found in water, should not exceed the limits as illustrated below:

| Element | Chemical | Max limit MG |
|---------|----------|--------------|
| Arsenic | As       | 0.05         |
| Cad-    | Cd       | 0.01         |
| mium    | CN       | 0.05         |
| Cyanide | Pb       | 0.1          |
| Lead    | Hg       | 0.001        |
| Mercury | Se       | 0.01         |