Troubled Waters

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Purpose: To describe what causes the growing water crisis and examine how we can counter it.

Audience: Busy people who are interested in educating themselves about the freshwater crisis.

Troubled Waters

"Water, water everywhere, nor any drop to drink!" This line originated with poet Samuel Taylor Coleridge, who was describing the plight of ancient mariners. The sea-goers would often run out of drinkable freshwater during a long voyage, but find themselves surrounded by salty, contaminated sea water on all sides. Desalination technologies were not yet available, so the men could not transform the brackish water into a drinkable form; they were forced to survive without any measurable amount of freshwater. Nowadays, the human population as a whole finds itself in a similar situation. A rise in population, among other factors, increases the demand for freshwater, which further depletes the few freshwater resources available. Conservation techniques and other forms of freshwater protection must begin now, while freshwater is still naturally available.

Causes of the Freshwater Crisis

The demand for freshwater has sky-rocketed during the past century due to a rapidly increasing world population. More than 50% of the world's accessible freshwater is used by humans in one way or another, and this percentage increases with the world's increasing population. In fact, some scientists estimate that this percentage will climb to 75% by the year 2025 (Peck).

Contaminated Water

Statistics also show that 1.5 billion people do not have access to drinking water and 3.3 billion people lack access to clean water due to a contaminate of some sort. In third world countries, some contaminates are due to the dumping of untreated wastewater into rivers and streams. This, in turn, causes over 250 million people to contract one or more waterborne diseases per year. Of this number, 5-10 million of these illnesses result in death (Peck).

Pollutants and other contaminants invade local water sources and make even less clean freshwater available.

Pollution further adds to the increasing lack of access to clean freshwater. An increase in population, urbanization and industry adds to the productivity of pollution and, in

turn, a decrease in the productivity of sanitary freshwater. In fact, in China, four out of five waterways are so polluted that they cannot be used (Lane-Miller).

A Change in the Winds

Climate changes and geography also contribute to the increasing lack of freshwater. A geographic area can supply only a certain amount of natural water, and this amount either remains the same or decreases over time as the population, and, in turn, the demand for water increases. More people means more water required for household uses, irrigation, agricultural purposes, plumbing, industry and the production of food.

Access Denied

Many areas do not have access to abundant amounts of water year-round. Such areas rely on annual or seasonal climate changes during which time more time water, be it in the form of rain, snow, ice, a monsoon or anything else, naturally occurs. These regions have learned to take advantage of such abundant amounts of water by storing and conserving it. While there may be an overwhelming amount of water during the wet season, there is often a desperate need for water at other times of the year during which stored water becomes the most reliable and easily accessible source.

While a number of more developed countries can easily retrieve water from a conveniently located spigot, the people living in other regions must walk for miles to fetch water from a faraway well daily.

Water makes up seven tenths of the earth's surface, but just three percent of all water is freshwater and the majority of this small percentage is difficult, if not impossible, for humans to obtain. This difficulty is greatly due to glaciers and other large blocks of ice located in earth's polar regions because they are made up of 75% of the earth's freshwater (Tacio & Hinrichsen).

Many countries cannot afford to transport clean freshwater from the source to the people.

No Money, Honey

Another reason for the lack of water in many under developed countries is that the people lack the funds necessary to purchase, transport and purify water. This financial insufficiency is

a ridiculous, but all too real reason for a deficiency of clean water. All living things require water for survival, so depriving them of this necessity is just cruel. While wealthier people can purchase as much water as they please, those with less money are left to suffer. Increasing the price of water just compounds the problem and makes it so that even fewer people have access to the un-substitutable liquid.

Experts presume that if the planet's freshwater supply were to be equally divided throughout the globe, there would be more than enough water to provide the necessary amount to support humanity. But had the world been perfect and water been evenly distributed throughout, humans would still have to find a way around contaminants and other waterborne diseases.

Effects of the Freshwater Crisis

Effects of the freshwater crisis can be observed all over the globe; however, the severity of the effects differs from place to place. For example, Africa and China suffer more than Latin America does from the water crisis. This inequality is due to the difference in geographies. Latin America benefits from an abundant supply of natural water and easy access to such water sources. But, in Africa, the terrain is so difficult to navigate that people lack access to natural sources of water, which means that since they already lack an adequate supply of water, the crisis hits them harder than it does Latin America. While some regions have access to a seemingly infinite amount of clean freshwater, others are more arid and, in turn, lack enough freshwater to support a growing nation (Lane-Miller).

Environmental Suffrage

Freshwater environments suffer from human interferences, such as the building of dams.

Freshwater ecosystems are suffering from the water crisis just as much, if not more, than humans. Of all the different habitats, those with freshwater suffer the most endangerment. This environmental distress is mainly due to manmade influences, although Mother Nature does contribute to some of the habitat loss. Manmade influences include dams, pollution and the introduction of nonnative species, which were often put into place to weaken the effect of the water crisis and make greater amounts of water accessible to humans. Natural negative influences, on

the other hand, include erosion and an increasing lack of natural freshwater due to manmade constructions weakening the water flow (Revenga & Mock).

According to current data, 71% of freshwater species' extinctions are due to changes in their habitats, such as dams, that were constructed by man. Another 54% of these animals' deaths can be attributed to the introduction of nonnative species, and 26% more are caused by pollution (Revenga & Mock).

Human Interference

Some tribulations caused by dams include the interference of many animals' migratory patterns, a change in the specific ecosystem's food chain, and the evaporation of many wetlands due to a restriction in the amount of water flow and an overall deep impact in the environment's way of life (Revenga & Mock).

Mankind, however, benefits from the installation of dams in natural water sources. Such structures are necessary for development, the transfer and storage of potable water, energy resources, electric power and the prevention of floods.

The United States and a number of other developed countries have recognized the problems dams cause and are doing what they can to alleviate their adverse effects on the environment. For example, regulations, like how long and when one can activate their sprinklers, have been put into effect which limits damage done to the ecosystem.

Misuse of Supplies

Freshwater environments are also effected by the misuse of natural water supplies. Approximately half the world's freshwater ecosystems have disappeared in the last 100 years due to human developments, such as industries, factories and other sources that produce pollutants. Depletion of such pristine environments can lead animals to abandon their homes in search of a healthier environment, which few actually encounter before meeting their deaths (Peck).

Water contamination and the improper use of water negatively affect many freshwater species, such as coy.

Animal Endangerment

Much of the biodiversity found in freshwater ecosystems consists of threatened and endangered species, like certain kinds of fish. Depletion of water resources

causes the low population numbers of fish to dwindle even further. In addition, banks previously covered with water that have recently been exposed to air are known to attract many unwanted inhabitants, like mosquitoes, which negatively affect the ecosystem as well (Peck).

Actions to counter the destruction of freshwater habitats need to be taken and they need to be taken soon because the majority of life on Earth relies on freshwater for existence, and species that can only thrive in a freshwater atmosphere account for approximately 12% of all species of animals (Revenga & Mock).

If humans do not engage in water conservation activities now, then future generations may not have any natural and clean freshwater.

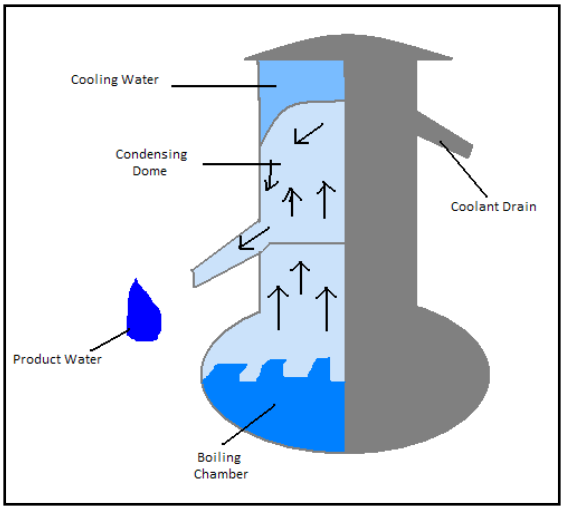
Making Use of Freshwater Resources Available

In order to preserve life in the future, water preservation must begin now. Preservation techniques include increasing the cost of clean freshwater, using desalination technologies available, and conserving water.

According to some environmentalists, water is so inexpensive that people who have easy access to it often take advantage of its availability and do not even think about conserving it for other uses. It is believed that raising the price of freshwater would encourage people to limit their usage of water. The additional funds could contribute to the development of better systems of water conservation, such as recycling and reclamation—which would allow water to be reused for irrigation purposes—and producing freshwater from salt water (Rogers, pages 51-53).

Desalination

Only 3% of all the water found on earth is freshwater while the rest of it contains salt, which humans cannot properly process. Fortunately, new technologies make it possible to dissect salt water and remove the saline content, thus resulting in freshwater, which can then be used for human consumption ("The Importance").

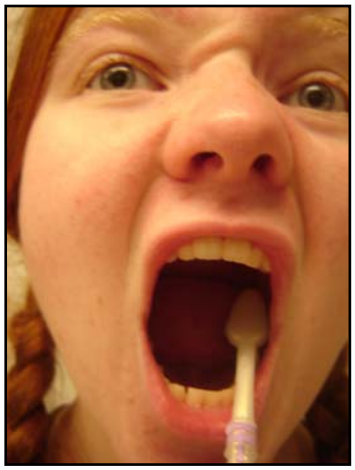


Desalination technologies evaporate water and leave the salt behind. This frees the water of all salt contaminants and produces freshwater.

Desalination, or distillation, the process of removing salt from salt water, is becoming an increasingly popular means of obtaining freshwater. With the world of water dominated by water that contains salt, it is imperative that desalination technologies available continue to be further explored. Presently, the desalination techniques available require a large amount of energy to function properly; however, future innovations will decrease energy consumption. This, in turn, will yield an increase in the productivity of water without salt.

Desalination was one of the first types of water treatment ever to be practiced by man and is still in use across the globe to this day. Originally, this process was used by sailors aboard ships at sea to transform the salt water available to them into a drinkable form. Nowadays, distillation is for the purpose of making freshwater out of salt water and to rid any kind of contaminant from any kind of water. For such processes, distillation removes whatever contaminants the water possesses rather than salt, as it would remove from salt water.

The process of desalination greatly resembles the water cycle found in nature, known as the hydrologic cycle. This cycle is put into motion when the sun converts liquid water from earth's surface into a vapor that rises into the atmosphere, a process known as evaporation. The water vapor then encounters cooler air, which causes it to once again liquefy, or condense. Once this occurs, the liquid returns to earth as precipitation and the cycle repeats. Desalination is virtually the same process, but in a contained environment that extracts the water contaminants when the water evaporates.



On average, three gallons of water is sacrificed per day per individual for brushing their teeth.

Water Conservation

While desalination is an extraordinary means of decreasing the continually climbing demand for freshwater, conservation is another necessary process to ensure that freshwater remains a natural resource for years to come. Conservation is inexpensive, effective and environmentally friendly. It can also take place virtually anywhere indoors, like the bathroom or the kitchen, or outdoors, like the lawn.

By altering a small factor in one's daily routine, one can save thousands of gallons of water. For example, in the bathroom, turning the faucet off while brushing one's teeth saves three

gallons of water a day. In the kitchen, one can save water by rinsing vegetables in a tub filled with clean water rather than in continually running water from the faucet. And adjusting the sprinklers outside so that they only water the lawn and plant life saves five hundred gallons of water every month ("Household Hints").

Money is conserved along with the conservation of water because more water used equals more money spent to pay the bill; therefore, a decrease in the amount of water one uses also means a decrease the amount of money one spends. Conserving water is a win-win solution for the environment, the individual and his or her wallet.

Conserving water also saves energy, which saves even more money. A small percentage of each state's energy is contributed directly to water in some way, especially the treatment and pumping of water. This means that saving water saves the state both energy and money.

Simple water conservation practices can make a bigger difference than one might suspect. In fact, entire habitats can be better preserved if enough conservation takes place.

There are unlimited benefits to conserving water. Conservation both increases the water supply readily available for use and protects the environment while saving the conservators' money.

It is important economically and environmentally to limit the misuse of natural resources, such as water. Overcoming the water shortage can succeed, though not overnight or easily. It will involve intelligence and perseverance on everyone's part in order to achieve this goal. If world powers work together to overcome the water shortage, water can be successfully preserved for future uses. New technologies are not necessary for such advancements; the usage of existing means must be encouraged in order to increase our water supply.

Uses of Freshwater

Freshwater fuels all forms of life, from something as simple as a plant to something as complex as a human being, and since human bodies are comprised of 98 percent water that is one resource we cannot live without.

Bodies of Water

Freshwater directly contributes to one's health because of its unique ability to breakdown food, rid the body of excess waste products, properly maintain body cells, tone muscles, and regulate a uniform temperature throughout the body. Basically, freshwater is responsible for keeping our bodies running as they should.

Our bodies demand freshwater over salt water for many reasons, the most important being that human bodies cannot physically handle the amount of salt that would accompany the amount of water our bodies require. While the body can easily absorb the water from saltwater, body cells are left to deal with the salt, which destroys the cells and dehydrates the body.

Dehydration

Lack of freshwater due to failure to consume enough fluids or losing too much fluid often results in dehydration. The severity of the dehydration depends on the amount of water the body has lost in comparison to the amount of water the body usually has. If dehydration is very severe, it can be lethal.

Human bodies are physically incapable of processing large quantities of salt water; it leads to dehydration

Dehydration is more common in children than adults because their bodies have not yet fully developed. Since their bladders are smaller and they must relieve themselves more often than adults do, this excess loss of water can result in dehydration. The elderly and the sickly also suffer from dehydration more than the average healthy individual because their bodies are more susceptible to disease.

Dehydration results in a lower bodily fluid output than normal because the body makes use of every drop of water it can find. Additional symptoms of dehydration include lethargy, vomiting, diarrhea, low blood pressure, rapid heart rate and a coma, if severe enough.

A mild case of dehydration can generally be taken care of in one easy step: drinking plenty of fluids, which is why water must remain an easily accessible resource. It is not recommended to consume an

excess amount of liquid at one time, though, because this could result in more nausea and severe collywobbles, or stomach cramps. For a more severe case of dehydration, a doctor should be approached.

With the severity of dehydration and other problems related to the freshwater crisis as common as they are, a lack of freshwater is no laughing matter. Water is a necessity to all living things, but not just any kind of water—freshwater. There is no other substance known to man that retains all of the amazing qualities that freshwater does. There is no substitute or replacement for freshwater, so actions must be taken now to conserve this matchless resource.

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