Water’s Effect on Poverty

Water is a truly remarkable substance; it’s found in all three states of matter on the Earth, it has an unusually high heat capacity, and acts as the universal solvent. On top of all that it also demonstrates strong adhesive and cohesive properties. The reason this one molecule posses so many unique qualities stems from it’s polarity. When the oxygen atom bonds with two hydrogen atoms, the bond angles are not an even 120° as one might expect. Oxygen is more electronegative, meaning that it attracts electrons more strongly than hydrogen. As a result of the altered bond angle, the water molecule ends up with a negatively charged oxygen side while the hydrogen side remains positive, rather than the charges canceling out. It seems by chance, that such a unique molecule would exist that so perfectly facilitates the emergence of life, as we know it. Despite the great miracle that is water, the absence of clean water has served as the blight for many civilizations for as long as humans have inhabited the Earth.

The human body is approximately 65% water and yet without it we are nothing. Many people live with delusions of invulnerability, but in reality the human condition is very fragile. Water carries nutrients to our cells, as well as disposing of waste on top of being the main catalyst in digestion. It’s also the primary ingredient in the electrolyte solutions our nervous system uses to conduct electro-neural impulses and is crucial to the distribution and regulation of body heat (Rochester.edu). In other words, without water not a single part of the body would work. Dehydration occurs in multiple stages, the first is when about 1% of water weight is lost, at which point physical and cognitive abilities are mildly impaired, accompanied by dry-mouth and reduced urination. The next stage occurs when about 2-4 % is lost at which point victims suffer sunken eyes, dry skin, fast heart rate, and lethargy. When more than 10% of water weight is lost the victim suffers intense migraines, organ failure and finally death. Death due to hydration often occurs after 3 consecutive days without fluids. While it may take three days to die, it only takes one day of dehydration to become incapacitated to the extent of not being able to work. When a migrant or day worker can not access water they can not work and the resulting lack of income keeps them from acquiring the food and water they need to work let alone survive. This vicious cycle is known as the water poverty trap. Not only does the poverty trap affect the poor directly but also their respective economies and governments who suffer under the weight of providing for a society that is not self sufficient.

Dehydration, however, is not the leading concern when it comes to water, water borne illness and pathogens constitute the largest threat to the impoverished. There are many diseases that are contracted through contaminated water; for example, cholera, hepatitis and typhoid fever are all bacterial diseases that can be transmitted directly through drinking unpurified water. Other parasitic diseases like dysentery and malaria are also linked to unclean water but are often transmitted indirectly via a host, such as malaria contracted from mosquitos that thrive in stagnant unsanitary water. With 783 million people across the globe lacking access to clean water, these illnesses are not isolated incidents and collectively account for the largest cause of death world wide.

These challenges have some catastrophic implications. Rural villages constitute 84% of people who do not have access to clean water and the large distance between villages provides logistical obstacles in the fight to provide safe drinking water. One of the least obvious consequences of poor water infrastructure is lost time. Water sources are often located many miles away from the impoverished rural villages they sustain. Girls under the age of 15 are twice as likely to be tasked with fetching water, a track that often costs three to four hours daily and entails hoisting 40-pound jugs the entire time (Water Project.org). The time constraints associated with collecting water prevent children from attending school, parents from perusing their careers and matriarchs from raising their families. The saying “time is money” applies even in places where there is practically no money; take away people’s time and their livelihood disappears with it. The most devastating result of poor water sanitization is the diseases that are contracted in developing countries. Annually, water borne illness robs it’s victims of 433 million school days, half of all hospital beds globally, and 3.4 million lives, making it the leading cause of death world wide. They are also responsible for 1/5 of deaths under the age of five and about 80% of illnesses in developing countries (Water Project.org). The reason these illnesses devastate developing countries and fail to register a blip on the radar of modernized nations is infrastructure. Sixty six percent of people in Sub- Saharan Africa lack access to a toilet while 50% of primary schools lack even the most primitive forms of plumbing (World Health Organization). Unfortunately, the lack of plumbing in schools forces many female students to drop out at puberty. These statistics are startling but do not indicate an insurmountable challenge , rather they illustrate the failure of governments to address corruption internally. In developed countries like America, water sanitization is a negligible fraction of governmental spending, the real hurtle is holding the government accountable to make the necessary changes and educating the sanitization engineers who will be tasked with implementing sustainable solutions.