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Sustainability Research in West Africa

In America, we often take for granted such necessities as food and water. We expect to have an abundance of these at our every beck and call. We could not imagine not having food in our cupboards, let alone not having indoor plumbing. Yet, problems that are thousands of times worse than this exist in many nations throughout the world. Many people do not realize the severity of the sanitary water crisis because of one misleading fact: seventy percent of the world is covered in water. What people do not realize is that only three percent of this is fresh water, and two-thirds of the world's fresh water is frozen in polar ice caps. Of the small amount that is left, much of it is being used or polluted every day. Global water usage has increased by six times between 1900 and 1995. It is predicted that the global water usage will again double by the year 2050. Approximately three million people die each year from drinking polluted water or from a lack of water. The majority of these deaths occur in third-world nations that lack the funding for educational programs and domestic improvements in water quality. In Africa, women and children often spend hours each day hauling water in buckets from a river to their hut, just so they can wash their clothes or have enough to drink. Even if there is a decent supply of fresh water in these communities, the cleanliness of the water may be very poor. Often, people throw their wastes into the rivers because they do not realize the consequences of their actions. Farmers allow wastes from their animals to pollute the waters that they need. Many people, because they are not well educated in securing the cleanliness of their waters, urinate in the same rivers that they drink from. As the population of the world increases, water supply and cleanliness will continue to decline. To make matters worse, the nations that have rapidly growing populations are often the same countries with critical problems in water supply and safety. It is estimated that the world's population will increase to 7.2 billion people by the year 2015. 95% of this increase is expected to occur in developing nations. These third-world countries are already severely economically crippled. They are not able to support this continued dramatic increase in their populations. As a result, unless these water problems are solved, the mortality rates of these countries will continue to skyrocket.

Many things cause water scarcity and degradation. One major cause of water scarcity and pollution is the increase of the world's population. As populations increase, especially in nations that are already suffering from water scarcity, a higher demand for clean water will exist. Such an increase in population would not have as devastating an effect if humans did not waste or contaminate as much water as they do. In the United States, the average person consumes 380 liters of water per day. Due to the industrialization of the United States, these numbers are eschewed from the median because industrial factories consume great quantities of water. Nevertheless, the average American still consumes much more water than people of other nations. The United Nations considers 20-30 liters of water per person per day to be enough to meet human necessities. This means that the "average" American consumes 12 to 19 times as much water as required for human life. Since humans use and pollute water for our various recreational, agricultural, and industrial activities that we deem as "necessary", we consume large quantities of water to maintain our society. If we reduce our wastes, we will reduce our problems and ensure that future generations will have enough water to meet their needs. Finally, the main cause of water scarcity in a nation is climate and geography. Many parts of the world have suffered from desertification because of natural causes. However, humans have vastly increased the rate of desertification by overgrazing of their livestock. People are able to prevent

or slow down the rate of desertification if they are properly educated on how to limit the damage done by their livestock, even if it means raising fewer cattle. By creating effective water sanitation facilities and setting up practices for reversing desertification, these problems can be prevented.

Water security and availability are international problems. Every nation makes an impact on the security and availability of water in another nation. As one nation stores or uses a large supply of water, it causes a slight decrease in the availability of water for surrounding nations. The drastic problem of water scarcity occurs when the other nations do not have enough water resources to secure their needs. For example, as a nation dams a river to secure water and to create hydroelectric power, areas downstream of that dam suffer the consequences of a decreased water supply. It is obvious that if this river crosses international borders, this will cause problems for the downstream nation. Since water availability and security are international problems, nations should work together to solve it. It is our duty as a global community to ensure that all people have the right to clean water.

A shortage of water causes many problems. Dehydration is an obvious consequence of not having enough water to drink. Often, when they become thirsty enough, people will drink the unsanitary water, which will cause them to get a disease such as that from e. coli. Many other people will also die of contamination from toxins, such as lead, that are released into the streams and rivers from mining companies. Many people in third-world countries suffer from starvation because they do not have enough water to grow their crops. The process of desertification of a region often goes hand-in-hand with a shortage of water. As a shortage of water occurs, plants are not able to grow; as plants are not able to grow, the evaporation and erosion rates increase greatly. Industries such as fishing become virtually nonexistent as water shortages increase in severity. This not only harms the economies of these nations, but it devastates the environment. Countless numbers of species have become extinct due to desertification and deforestation. The Food and Agriculture Organization of the United Nations estimates that 13 million hectares of forests are cut down every year. Often, these regions that were deforested become overused by the ranchers and their cattle, which eventually leads to dramatic changes in the water cycles of the nearby regions. It is estimated that more than 2,000 of the world's freshwater species are extinct, endangered, or threatened as a result of water shortages in these ecosystems. This astonishing figure accounts for 20% of the world's known freshwater species.

People must have water to maintain personal hygiene because washing the hands is the most effective way to prevent disease from harmful bacteria, protozoans, and viruses. If people do not wash their hands after defecating or before eating, the chances for contracting diseases increase dramatically. Often, people in developing nations do not have enough water for personal hygiene, the water that they have is contaminated, or they do not know about the importance in maintaining good personal hygiene. Because of this, diseases are prominent throughout developing nations. Personal hygiene techniques, such as brushing one's teeth or washing one's hands, can increase the lifespan of people in these developing countries by many years.

A strong correlation between poverty and a lack of sanitary water exists. Many of the nations that have water shortages are extremely economically crippled. This is caused by the fact that water is the basis of almost every economic standpoint. It is necessary not only for agriculture, but it can be vital for transportation, energy, fishing, and as a key ingredient in either the production of, or the product itself, in almost every commercialized product in the world. Without an ample supply of sanitary water, the economies of third-world countries will remain stagnant. For example, only 28% of Sierra Leone's total population has access to sanitary

drinking water. Also, they have a remarkably low gross domestic product per capita of \$819. As of 1994, 74% of Cape Verde's population had access to sanitary drinking water. As expected, Cape Verde had a much higher gross domestic product per capita of \$7,102. The percentage of people with access to sanitary drinking water in Cape Verde is almost three times as great as that of Sierra Leone, and the gross domestic product per capita was almost nine times as great. The reasons for these correlations are obvious. As nations have a higher gross domestic product per capita, they can afford to secure access to sanitary drinking water for their people. This, in turn, will increase the lifespan of the people. Also, with fewer illnesses, the dependency on medicines is not as severe. As a result of fewer illnesses and longer lifespan, people will be working for a greater percentage of their lifetime, which will greatly benefit their economies. Nations that have a large percentage of their people without sanitary drinking water should do everything they can to create means for getting sanitary water to their people. Although this will cost their economies in the present, it will greatly improve their economy in future years. Also, as sanitary fresh water resources increase in the environment, tourism industries such as fishing and boating will drastically improve. With an ample supply of sanitary water to cool down machines, create hydroelectric power, or process foods, many other facets of the economies of these nations will receive a much needed boost.

80% of the global water usage is seized by agricultural purposes. Most of these demands cannot be reduced because world hunger is another important issue. It is sad how people in impoverished nations may be trapped in the predicament of choosing whether to have enough water to drink or whether to have enough food to eat. However, one way for Americans and citizens throughout the world can help to ease the troubles of impoverished nations is to eat less meat, especially beef. As cattle graze on the vegetation and compact the soil with their hooves, they dramatically speed up the desertification process. Also, many cattle rangers cut down necessary rainforests in order for their cattle have a place to graze. This is very detrimental to the environment. As the cattle ruin one area, farmers simply move their cattle to another area for grazing. This continues the horrifying cycle of deforestation and desertification. The United Nations estimates that 30% of freshwater is wasted in developing countries due to poor irrigation techniques. Proper irrigation techniques are vital to farmers because they can dramatically reduce the amount of water that is wasted while traveling from the body of water to the crops. Also, if aqueducts or other forms of secure irrigation canals are created, they can drastically reduce the amount of agricultural runoff and other pollutants entering the bodies of water. This will also help lessen the pollution, which, as a result, will help the farmers have healthier crops and a much higher crop yield.

The two most effective ways to solve water scarcity and pollution are to raise education levels and alleviate poverty. As people become more educated about how they are polluting their water sources and the detrimental effects polluted water has on their health, they are more likely to take measures to secure their water quality. Also, people must be educated on abstinence from sex. This will limit the outbreak of sexually transmitted diseases, and it will also help with population control. With a smaller population, it will be a lot easier to ensure that everyone has enough clean water to drink. Farmers must learn more effective irrigation techniques, and people must learn how to keep their waters clean. They must learn to not defecate or urinate in their rivers. They should also learn to transport the water away from the river for bathing. These actions are vital for securing sanitary water. Wealthy nations of the world should do their best to assist developing nations in creating systems for water purification and desalination. The problem with this is that these plants can be very expensive to build and maintain. A desalination plant that purifies 100 million gallons of salt water a day is estimated to cost about 270 million dollars in the United States. Costs for third-world nations may be even more expensive because

the industrialized parts and metals may need to be shipped to the isolated regions. Even after building this expensive plant, a great deal of financing would be required to maintain it. Desalination plants are generally built near power plants because they require a great amount of energy. Power plants in these developing nations would undoubtedly have to be built too because current power plants would not be able to provide the amount of electricity needed to power the desalination plants. These nations do not have the financing to be able to fund the construction and maintenance for these plants; however, their economies will dramatically improve with these investments, and the nations may be able to overcome the costs in a matter of a few decades. A united effort of nations, businesses, and individuals can overcome the problem of financing.

In western Africa, water scarcity and safety are starting to become severe problems. Currently, urban areas, such as Lagos, Nigeria, tend to suffer the most from water scarcity and pollution. Urban areas usually suffer even more than rural areas because there is a large demand for water and many people are not knowledgeable about how to keep their water sanitary. Therefore, the water resources that they have are often unsafe to drink. The life expectancy in Nigeria is only 47.1 years. This extremely low life expectancy is undoubtedly caused by their problems with poverty and water shortages. Personal hygiene is important for preventing disease, but many people in Africa do not have sanitary water with which to clean themselves. Disease is a huge problem for people in western Africa. Currently, HIV is the most feared disease in western Africa; however, waterborne diseases are prominent throughout these nations. Many areas of western Africa have extremely low percentages of the population having access to sanitary drinking water. A few of these include Guinea, with 48 percent of the total population; Mauritania, with 37% of the total population, Sierra Leone, with 28% of the total population; Burkina Faso, with 25% of the rural and 10% of the urban population; Gambia, with 12% of the rural population; and Liberia, with an estimate of only 6% of the urban population having access to safe drinking water. These estimates, by the Pacific Institute, are for the year 2000. Some nations, such as Nigeria, did not have recent estimates on the percentages of people with access to safe drinking water, although their percentages would be assumed to be fairly similar. In Africa, diarrhea, a symptom of many water-related diseases, is present in 7.7% of the population's deaths every year. This is an extremely high percentage, and yet, it still does not cover water-related deaths from diseases that do not produce diarrhea.

Many people are trying their hardest to help alleviate the problems of the global water shortage and the other detrimental effects that it causes, but it is obvious to see that current efforts in trying to overcome this problem have not been enough. If everyone works together, we can find a way to prevent this dire situation before it becomes even more insurmountable. The first step that we must take in solving this problem is to educate the people. The United Nations and the Peace Corps are two very important groups in educating the people of impoverished nations. The second step that we must take is to help alleviate poverty. Corporations can be important in helping with this, but they will have to be humanitarian in helping out these people. One small company that has helped to alleviate poverty in Africa is the Omani Cocoa Bean Company owned by Mr. Steve Wallace. Mr. Wallace was the first person to set up an international chocolate company that produces its gourmet chocolate only in Africa. Mr. Wallace sets up a financial plan that generously takes care of his employees. His employees receive medical care and subsidized housing. Also, he sets up financial plans that allow his employees to take part in profit sharing. Not only does this help his employees, but it also helps his company to produce finer chocolate. The workers will work harder to produce a higher quality product because when the company succeeds, they share in the success. The third and final step to ensuring high water quality is to develop means of creating a sufficient amount of sanitary water. The World Health Organization estimates that over half of the water projects in developing countries fail. The main

reasons for these are that the wells built in these nations either become contaminated (once again due to the peoples' lack of knowledge in how to prevent contamination of their water) or that the wells dry up due to overuse. The underground aquifers cannot replenish their supply of water to meet the demands of the people. This is why desalination plants need to be created in these nations. Desalination plants are more costly, but they ensure that the people will have enough quality water for years to come. These are the tasks that must be taken to eliminate the global water shortage. With a better understanding of the global water crisis in mind, the time is now for every one of us to step up and make a difference.

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