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Water Scarcity and Climate Change

As a stable and well-developed country, the United States takes countless opportunities and comfortable lifestyles for granted. There are many who ignore the signs of global warming and hold onto the belief that water is available for all. Sadly, that is not the case. Rainfall patterns in semi-arid regions, such as East Africa, are unpredictable and wash away precious top soil. Droughts have increased tremendously and at inopportune times. Groundwater levels are depleting and rivers are drying up. Water scarcity and climate change are not only affecting the environment but millions of people. There are 884 million people without access to clean water while 2.5 billion lack basic sanitation needs. Only twenty percent of the world's population has access to running water from sinks and a toilet to flush away wastes.

“Access to a secure, safe and sufficient source of fresh water is a fundamental requirement for the survival, well-being and socio-economic development of all humanity. Yet, we continue to act as if fresh water were a perpetually abundant resource. It is not.”—KOFI ANNAN, UNITED NATIONS SECRETARY-GENERAL.

According to the British Medical Journal, sanitation is more important than antibiotics and anesthesia and will be a main concern for financial support in underdeveloped countries. By 2025, the United Nations estimates that for every three people, two will be living with water scarcity. “One of the great contradictions in human nature is that we value things only when they are scarce,” United Nations Under-Secretary-General Elizabeth Dowdeswell states. “We only appreciate the water once the well runs dry. And the wells are running dry not just in drought-prone areas but also in areas not traditionally associated with water scarcity.” On average, the United States and Europe use between 200-600 liters of water per day, yet as many as 1.8 million children are dying every year in developing countries simply because they do not have twenty liters of water/day. While we are enjoying our twenty-minute showers, automatic dishwashers, and aquatic centers, children in such regions like East Africa are dying each day simply because they do not have clean water to drink. In developing countries, tainted water is the cause of more than 1/3 of all deaths and more than eighty percent of diseases. With water so scarce, many families cannot find clean water at all; they have little option but to drink the tainted water and use it for crop production, cooking, etc.

In East Africa, small-scale subsistence farmers account for 80-90% of the rural population. Kenya has a population of 32 million growing 2.2% each year, yet only 8% of the country's land is available for crop production. Crop production is vital because marketing opportunities are few throughout the eastern countries. The rural poor, often in need of marketing opportunities, are located farthest from roads, schools, markets, and health services. Many must rely solely upon their own crop production for food and livelihood. With over-cultivation practices, population pressures, and unpredictable weather many families are having trouble adapting. Land that is only marginal for cultivation purposes is a last resort that many young, poor farmers must take. Knowledge on how to produce productive food in less fertile areas is unknown to the majority. Several hold onto practices such as relying mainly on rainfall, family labor, and the use of hand tools. Due to environmental and social changes, old practices are not as productive as they used to be.

The average rural family of 5.8 desperately tries to survive on one acre of land. With an average of one acre per household, there is little to no room for crop failure. Families are forced to give up vital

possessions to adapt to food insecurities. Cattle have decreased from an average of eight down to two per household because of feed shortages. Fifteen percent of households do not own oxen at all and are in danger of not having a labor force. With this drop in animal labor, families are doing the work by hand. Malnutrition is rampant and many families are not strong enough to productively farm the fields. As a result, they are left with a weakening crop and an increasing hunger. The probability of education is removed as an attempt to cope with hardships in food production. Women and children especially do not receive proper education because they are forced to stay home, work in the fields, and tend to children/siblings. Because East Africa does not have irrigation to supply water to households and farmland, women are to bring back water everyday. As many as 443 school days around the world are lost each year because children are forced to do daily chores of fetching water (at times taking four hours to reach) and field work.

I interviewed Moses Bomett, a sixteen-year-old from Nakuru, Kenya, who stated, “The main cause of these problems is the root cause ignorance that is in the people...lack of knowledge to be self independent, lack of knowledge to be able to come up with solutions to the problems in Africa. That is why the answer is good quality education.” Bomett, even though young, has taken many steps in helping Africa. He has started an organization called H.O.P.E for Africa which focusing on the importance of education in a suffering continent. Moses is not the only person who notices that education and poverty go hand in hand. The Prime Minister of the United Kingdom and Great Britain, Gordon Brown, vowed to invest £15 billion into education. Sadly, without efforts of improving the health, water, and marketing situations in Africa, educational money is wasted.

Poverty and hunger are typical obstacles in arid regions like East Africa. Climate change has had a tremendous impact on these areas causing changing rainfall patterns, more frequent droughts, and an increase of natural disasters. Farmers in Kenya, Africa currently grow maize, rice, legumes, sorghum, and pulses. Due to these climatic changes, farmers cannot abundantly grow the same crops they did in the past. I asked Bomett what his family’s diet was like. “Our typical meals were tea and bread for breakfast, rice and beans for lunch and maize with any available vegetable...people love fruits but they are hard to get because they are not there or they are too expensive,” Moses stated. His answer was surprising because his family was not one of the ultra poor, and yet they still had few choices for food.

In the midst of the soil degeneration due to over cropping and climate changes occurring, productivity for farmers has decreased. Poor farmers are left with fewer resources to obtain fertilizers or soil preservation methods. Even in years with a good harvest, poor farm families still experience food shortages two out of every twelve months. Malnutrition affects 45% of the population in sub-Saharan Africa and 70-80% live on less than one US dollar a day. Poverty in rural areas is as much as four times higher than urban areas with the majority living on less than fifty cents a day! This lack of food production and scarce income from family members has had devastating results. One in every six children die before reaching the age of five while nearly half of the survivors are physically stunted and have learning disabilities.

Multiple studies have shown that the main constraint to agricultural production is depletion of organic matter within the soil. A main reason for this depletion is the rise in climate variations and the lack of water availability. Currently, crop production is the largest water-consuming division business accounting for over 70% of the world’s total water use. To satisfy a person’s daily requirement of food about 2000-3000 liters of water is needed for production. Drinking purposes require two to three liters of water and for good sanitation, 20-300 liters of water are desired. Even though crop production accounts for the majority of the available water, crops are still suffering. This is because much of the water is wasted in underdeveloped countries due to a lack of irrigation systems. Irrigation is necessary for crop production. Without irrigation, top soils are washing away one day and then drying up the next. A

common method of farming held by many African's is rainfed production. Sadly, this method needs to be altered to include irrigation. Rainfed irrigation is a method that many farming systems must incorporate in order to increase yields and keep the nutritious top soil from washing away.

Water scarcity and climate change affect more than agricultural production. The degradation of the environment leads to increased temperature change. Animals, ecosystems, and populations notice the effects of changing temperatures. Rising levels of carbon dioxide are causing global warming; coral reefs are losing their wildlife and natural maintenance; rivers are polluted and drying up. In view of the fact that natural ecosystems are threatened, many of the impoverished are not able to depend on the ecosystem's productivity for food or income.

What are the trends for water scarcity and climate change? Water for agricultural purposes will increase by 60-90% in order to cope with the growing population and food production needs. Freshwater use alone will rise by some 14%. By 2030, 1.8 billion people will be living with water scarcity. In 1990, Africa alone had eight countries suffering from water stress or scarcity; by 2025, that number will jump to some twenty different countries! The situation for farm families will thus get worse as fresh water becomes less accessible. A trapping cycle could take effect on many of the poor. Education will be cut in order to survive. Without education, people cannot improve their livelihoods and are too desperate to take any chances on changing farming methods. Rural families that are without access to markets are also without access to any form of credit. Since many of the governments in Africa do not supply credit, farming methods are almost impossible to change. Families cannot afford a bad harvest. If the harvest is bad, poverty and starvation for the family gets worse. The cycle of trapping occurs, leaving family members uneducated, helpless from markets or credit, and without food. They are not able to have productive labor on the farm in order to improve their situation. If the ways in which small-scale subsistence farmers use water improves then fresh water will not be wasted on attempts to harvest nonproductive fields. In future years wasting as little water as possible will be very important. Kofi Annan, UN Secretary-General stated, "fresh water is precious: we cannot live without it. It is irreplaceable: there are no substitutes for it. And it is sensitive: human activity has a profound impact on the quantity and quality of fresh water available."

How can human activity help the trends of water scarcity today? Many people hold expectations that agriculture improvements will deliver high economic opportunities in rural areas. In order to see improvements, practices on family farms must integrate rainfed irrigation. Irrigation will not only help the crop production but it will also improve the education and poverty levels of the rural poor. Women will be able to attend school instead of spending hours a day fetching water. Marketing opportunities may still be few, but with an increase in production, income will improve for families; money will not have to be spent buying food that they could not harvest nor having to sell their own goods in order to survive. Livelihoods would improve if people would take time to recognize the importance of farming methods. By taking that time and integrating new farming techniques, increased productivity will occur along with less use of water.

Very few farmers are informed of current farming innovations for better productivity. They are not up to date because of the time used to tend crops pulls their children out of school to obtain water. As brought out before, lack of education brings lack of productivity. Many farmers will over cultivate their soil and have little knowledge that their soil is lacking vital nutrients. Farmers continue to grow the same crops year after year and deplete the once fertile soil so much that yields suffer. Along with suffering yields, farmers are not educated on how to plant crops to fight drought or withstand the sudden rainfalls that flood crops. Steps must be taken in order to improve these trends and reverse this cycle of water scarcity and poverty. Agricultural strategies that focus on crop diversity, conservation tillage practices, and use of cover crops will increase the well-being of farm families.

Abundant agricultural practices in the United States are not utilized in many East African countries. In Kenya, Africa for example, many farmers are without money or resources to receive fertilizers. Nutrient lacking soil results from not have any form of fertilizers from livestock. The common practice of rotating crops in most American farms in order to restore lost nutrients is a practice that many in Africa are just learning. If farmers mix the main crop, maize with beans, nitrogen will be put back into the soil, reducing soil erosion, and providing sufficient yields to families.

All nations (not just the nations suffering from water scarcity) need to watch the use of water, integrate rainfed irrigation into their farming practices, and take steps toward improving global warming. With the crisis of water scarcity, cooperation from every country is needed. Water scarcity is not entirely about a lack of water. It is about a lack of clean water where people need it most. There are countries in Africa that are very abundant with fresh water sources, yet the countries bordering them are without any. By implementing water management, governments can improve the conditions of the land and the livelihoods of its sufferers. Better water management will not only help surrounding countries, but it will help the environment as a whole. Ground water levels have dropped tremendously but if rainfed irrigation is put into practice, river levels will improve and the strain on ground water levels will be reduced. Rainfed irrigation will also help crop production. If farms that receive too much rainfall followed by long periods of drought are irrigated, excess water from the farm can be stored to alleviate the loss of soil and crops. This form of irrigation will also help farmers that are without rain. Instead of removing family members from school to compensate for irrigation, the farm will receive water from places with surplus amounts. The United Nations adamantly vocalize the issue of water scarcity, yet not everyone is listening. It is true that “people do not know what they have until it is gone.” An answer to the issue is not procrastination. Water scarcity is about keeping people alive, the betterment of futures for children, and helping our environment. Every year people die from contaminated water, and if the issue of water scarcity is not reiterated, more lives will be lost. The World Bank could play a huge roll in helping with water scarcity and the livelihoods of people. Most governments do not supply credit. Without credit, it is difficult to break the trends of farming or purchase resources for improvement. If credit was supplied to those without, irrigation within communities could be developed, crops that will survive droughts purchased, and the catastrophic cycle of hunger and poverty would be broken.

We are living in a time of changing climates, rampant disease, and increasing population. We are living in a time of starving children, uneducated children, and millions without sanitation. We are also living in a time full of opportunities, people wanting to help, and those who already are. Now is not the time to procrastinate. Those of us who are educated about the effects of water scarcity should educate others. Through education, futures improve and people become less dependent. While many in other countries are receiving aid, there will hopefully be a time when they will not need it. By all nations coming together to combat water scarcity, it will leave people with one less battle to fight. Improving water scarcity will allow those suffering to improve their livelihoods and the lives of their children. If nations come together to alleviate water scarcity today, 6000 lives will be saved tomorrow.

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