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Chad: Revolutionary Practices Combat Water Scarcity

Chad, located in the heart of Africa, remains one of the poorest nations in the world. The World Food Programme stated that more than 3.5 million Chadians are food insecure. The large number of refugees from Sudan's Darfur region (255,000) as well as the Central African Republic (188,000) only heightens Chad's food insecurity. ("Sahel Crisis- Chad") In rural areas, local farmers and herders rely on animals such as cattle and goats for their livelihood. When hundreds of thousands of animals die off as a result of drought and other environmental factors, these farmers have no way to feed their families. Tactics recently employed in Eastern Chad by the United Nations High Commissioner for Refugees (UNHCR) using satellite images to identify water flow have proven to help Chad's water situation by pinpointing all known sources of water in the area. This new water technology will save families' time, which can now be better spent on matters relating to improving their socioeconomic status. Additional solutions, proposed by the Lake Chad Basin Commission (LCBC) also look promising.

A typical Chadian farm family consists of 6 people (four children, two parents) with weekly food expenditures not likely to exceed a few dollars. In Peter Manzel's "What The World Eats" photo-essay, the refugees living in Chad that he depicts spends approximately \$1.23 on food each week. ("Hungry Planet: 'What the World Eats'.") They are herders so they do not grow anything, which makes the water scarcity situation particularly challenging for them. All of the children would attend primary school, but the boys would likely dropout later on to help the father with herding. The women will typically work in various villages harvesting and will usually earn around one dollar a day. Since the herding profession is rather nomadic, they do not technically have a farming area. The annual income of this family would be \$653. ("GNI per capita, Atlas method...") But, if droughts continue as severely as they have, the typical family's income will decrease. Goat meat is a favorite of the family, which they often share with other families during high holidays such as Ramadan. With the recent droughts, the men of the family would have less milk to feed their children and less grain to feed their livestock, making survival difficult. Access to healthcare is also extremely tenuous. Only 4% of the entire rural population has access to improved sanitation facilities. In terms of caring for livestock, many animals have become disease ridden as a result of drought and care for them is also extremely limited.

It is important to note the lack availability of water in Chad. 15-20 liters is the recommended amount of water to be consumed by an individual daily. Many Sudanese refugees living in Chad only obtain five or six liters a day. Abeche, the major city of Eastern Chad, is a prime example of water scarcity in Chad. This seemingly basic human necessity is only available every four or even five days for only a few hours at a time. Often this water is caught in crowded lines by buckets, pots and pans. The increase in banditry as a result of the surplus of Sudanese rebels can also make the water gathering process dangerous in addition to difficult. The women of a typical Chadian family will likely have to walk many miles to obtain their ration of water. With the recent droughts, this water becomes even more precious.

Rainfall in Chad is also on the decline. Less rain mean less food production for families, and ultimately more hunger. The Chadian climate, like most of Africa, is traditionally very hot all the time. But the following numbers were strange even for Africa. In 2009, not even 150 millimeters of rainfall were recorded, compared to 355 millimeters in 1950. ("Tackling Climate Change in Eastern Chad") Climate change in Chad has been noted as a factor for Chad's rainfall decline. Climate change itself stems from the enormous amount of deforestation taking place in Chad. ("Refugees-Chad: Water and Food Shortages Worsen.") The rainfall situation in Chad does not appear to be improving by any means, so other measures need to be taken to preserve what little rainwater is available.

In the rural parts of Chad, including areas in the East, owning healthy cattle is key to life. An analysis by Integrated Regional Information Networks (IRIN Global) states, “Cattle are currency, the down-payment on ceremonies, a savings plan during sickness and emergency food in lean times.” (“Chad: When the Cattle Die, So Does Wealth.”) This quotation shows cattle are much more than just necessary farm animals. They are essential to the rural Chadian lifestyle. In 2010, as a result of drought approximately one-third of Chad’s livestock were killed off, with nearly 800,000 dying in 2009 from similar causes. It is not uncommon for a herder to lose 15-20% of his herd to drought and other problems. (“Eyewitness: Livestock Farmers Face the Hunger Season in Chad.”) Since cattle herders are used to feeding their own families, they have no means of purchasing grain or other nutrients as their prices grow higher. (“UN Agency Boosts Aid to Livestock Herders...”) Grain prices in the city of Mongo rose 7% between April and May and are 48% greater than the five-year average. (“Chad Food Security Outlook Update”) Efforts led by the Food and Agricultural Organization (FAO) have certainly helped the rural farmers in Chad. In addition, Action Against Hunger supplied 600 metric tons of animal food to almost 4,000 herders to ensure that their animals stay alive. (“Eyewitness: Livestock Farmers Face the Hunger Season in Chad.”) Organizations such as these have definitely had a positive affect on the areas they serve. But aid alone cannot save the nation from its low supply of clean water, which continues to decrease grazing areas, which ultimately kills off cattle. (“Chad Food Security Outlook Update) Without rain, the cattle have neither water nor plants to eat and struggle to survive. Their struggles in turn affect the lives of their owners, who can no longer extract milk from the cattle to feed their families, as the animals are extremely malnourished. (“Chad: When the Cattle Die, So Does Wealth.”) Beyond malnourishment, the elimination of grazing areas leads to the spread of disease. (“Eyewitness: Livestock Farmers Face the Hunger Season in Chad.”) Specifically, farmers in northern Kanem have noted problems affecting cattle as well as camels. These problems result from malnutrition, which can stem from water scarcity since water is vital in keeping grazing areas thriving. (“Chad Food Security Outlook Update”)

Eastern Chad is where the nation struggles most in terms of developing a secure infrastructure, though improvements have been seen as a result of strengthened relations between Chad and the Sudan. But, a lack of natural resources, namely water and basic nutrients, makes the working environment in Chad very difficult. The large number of refugees from neighboring states also put pressure on the supply of resources. Access to clean water supplies remains a major problem in the East, and when such problems are unaddressed disease can spread to people and often more crucially, to animals such as cattle. Desertification and climate change have been cited as two major reasons for water scarcity in Chad, most notably in Lake Chad. Since 1960, Lake Chad’s area has decreased by 95%. (“Climate Change Linked to Nutrition Crisis in Chad”) Lake Chad is shared between four countries- Nigeria, Chad, Cameroon and Niger. 40 years ago, there were approximately 15,000 square miles of water, while now there are only 500 square miles. The effect of the loss of water in Lake Chad is devastating to its inhabitants. Herders, fishermen and small farmers are all affected by this massive size reduction. An estimated 30 million Africans from each respective country rely on Lake Chad for their livelihoods. (“Nigeria: Climate Change- Council Race to Save Lake Chad.”) One local says, “Survival becomes a real problem here because we have no other means of livelihood.” A fisherman noted that he usually makes around 750 naira (€3), while just a few years ago he had daily profits of 15,000 Naira (€750) (“Slow Death of Africa’s Lake Chad.”) Yakowra Malloum, a UNICEF worker, says, “When I was young, it was beautiful and there was plenty of water and food to eat... people rely on farming, yet there is not enough grass for the cows to eat, so they longer produce milk.” Malloum sums up the core of the water crisis in Chad. Such trends show little sign of changing. Such trends can be measured in amount of rainfall, family income, as well as change in size of water sources. These trends are not benefiting the situation of rural Chadian families. As the lake continues to shrink, more people (including herders, farmers and fishermen) will leave Chad in search of work elsewhere. But if Lake Chad’s size were to increase, then income and food production of these several million Chadians would without a doubt be stimulated greatly. Specifically, more fish would be a byproduct of this restoration, increasing the food and business of rural

Chadian fishermen. It is important to note that not just fishermen will be affected, but also typical herding families that rely on the lake for water.

Conflicts in other nations such as Libya and Nigeria have also affected these farmers economically. When trade is blocked between these nations, Chadian agricultural workers struggle to trade camels, cows and goats, as Nigeria and Libya are Chad's top trade partner in that category. ("Eyewitness: Livestock Farmers Face the Hunger Season in Chad.") Without water, the herders lose nutrients for their animals. Without their animals, they lose the ability to trade in an already limited marketplace. The few animals these herders have left are quickly dying off as a result of water scarcity, as seen most prominently in Lake Chad. William Batta, the director of Lake Chad research Institute believes desertification to be the number one factor in the lake's downfall. Poor irrigation techniques, including the South Chad Irrigation Project, have also contributed to Lake Chad's troubles. ("Slow Death of Africa's Lake Chad.") To put this in perspective, only around 0.5% (800 acres) of the original project is currently being irrigated. This shows that many of the attempted solutions to Lake Chad's problems have contributed further to its demise. The restoration of Lake Chad is key to a creating a better life for rural Chadian families. If the water in Lake Chad can be restored, even to a minor extent, there will be more to fish to eat and sell, more water for the herder's animals, and a better livelihood for the millions of Chadians that rely on Lake Chad.

The UNHCR, in a joint effort with several other United Nations offices, along with the French company Radar Technology France (RTF) is using remote sensing technology to help locate previously unknown water sources. In essence, this technology uses satellite images to identify water flow by pinpointing all known sources of water in the area. Using images taken by the US space shuttle, it becomes possible to determine land formations such as riverbeds that are sources of water. After locating the geographic markers where water is flowing, the data is given to the Geographical Information System (GIS), which proceeds to chart the data. Dinesh Shrestha, the UNHCR's senior water and sanitation officer, says, "[The technology] provides us with one more layer of information to enhance the search for water in such a vast area in a short amount of time." ("UNHCR and Partners Seek Solutions to Water Woes in Chad.") That extra layer of information, knowing where the water exactly is located, will be key in enhancing remote sensing technology.

There are a few flaws with this new technology. The water that is being located is underground and has the potential to be quite plentiful. But unfortunately, it is not able to determine how much water is in an area, but only that there *is some water* in that area. This makes the decision of process of where to drill for the water more of a guessing game than a logical scientific process.

This revolutionary technology provided by the UNHCR was first used in the Eastern part of Chad, as this is the area most affected by water scarcity. This technology is still relatively new, but should gradually be expanded to the whole of Chad, and perhaps even to other nations. Other African nations have already benefited from this technology. Ethiopia discovered that there are over 40 billion cubic meters of underground water in their country. ("UNESCO Heads East Africa Water Search.") The usefulness of remote sensing technology and underground water in Chad may not be this vast, but it is definitely a technology worth investing. Another way in which Chadian water scarcity can be addressed is through implementing the proposed solutions of the Lake Chad Basin Commission.

There have been many failed attempts to solve the situation concerning Lake Chad. Very little progress has been made. For nearly twenty years the four countries that border the lake- Cameroon, Chad, Niger and Nigeria- have been debating how to save this precious and shrinking body of water. Joined by the neighboring country of the Central African Republic, these five nations formed the Lake Chad Basin Commission.

The plan consists of designing a dam as well sixty miles of canals to pump water upwards from the Congo River to the River Chari, and flowing soon to Lake Chad. Having raised the equivalent of 3.5 million Euros solely for the purposes of a feasibility study, members of the Commission possess a strong belief in what they are attempting to accomplish. Says Wakil Bakar, the managing director of the Lake Chad Basin Commission, "All the countries- Chad, Niger, Cameroon, and Nigeria- we know what we have lost. It's going to be a huge benefit to all of us." If Bakar is right, the benefits to local fisherman and others will be exceptional. While the commissions confidence is encouraging, it is also important to note that there have been no successful attempts to fix the water problem in Lake Chad. The South Chad Irrigation Project, which was an attempt thirty years ago to fix the same situation. Although the problem was much less sever at the time, the project failed. Hundreds of miles of canals were constructed, but were not aligned properly so only one third of the land was ever irrigated. Since then, approximately .5% of the land from the original South Chad Irrigation Project is currently being irrigated. ("Slow Death of Africa's Lake Chad.") The cost of the commission's proposed project should be also addressed. The World Bank has worked on projects concerning Lake Chad in the past and it should continue to do so. Considering that Lake Chad provides life for 20-30 million Africans, there is no reason to suggest that the loss of this lake would not affect a great number of people. Therefore, funds be set aside for this project, or the livelihood of many citizens of four highly populated nations will be in jeopardy. To be specific, the World Bank should supply the Lake Chad Basin Commission (LCBC) with any additional funds (beyond the 3.5 million Euros) to complete a feasibility study for their project in Lake Chad. If this feasibility study cannot be completed, then the future of a typical Chadian family is at stake. Not only would fishermen be affected, but as well as the typical Chadian herding families that rely on Lake Chad for water.

Solving this situation by 2015 is an irresponsible goal. That is not to say that the issue of water scarcity cannot be improved by then. There are agricultural practices that can be utilized to help combat desertification. A method known as Farmer Managed Natural Regeneration (FMNR) has been proven to help reforest areas that have been affected by desertification. It involves the pruning of shrub roots to the effect that they can be grown among already productive fields. ("Sprouting Trees From the Underground Forest...")This can increase crop yield by 2-3%, which means firewood and a better livelihood for Chadians. Since desertification has also been cited as a reason for the destruction of Lake Chad, FMNR tackles two problems with one solution. In terms of local projects already taking place in Chad, remote sensing technology should definitely be scaled up to maximize its effect on families in need of water. In short, remote sensing technology, LCBC's proposed dam and the new agricultural practice, known as FMNR, will all contribute positively to water scarcity situation in Chad. Remote sensing technology will save families time and subsequently money. The proposed dam will expand Lake Chad and prevent Chadians from leaving the area to seek work elsewhere. FMNR will increase crop yield.

Based off of its history, the Chadian government should not take the leading role in implementing the potential solutions analyzed in this paper. The United Nations and it various offices should take the lead in implementing each measure. The UNHCR should take the lead of remote sensing technology. The Food and Agricultural Organization of the United Nations (FAO) should oversee FMNR. Although it is not a UN office, the World Bank should be in charge of implementing the dam proposal by the LCBC. The UN and the World Bank have successfully worked together countless times in the past and it only makes sense for them to work again in Chad. The World Bank would ideally supply funding to LCBC for their dam project concerning Lake Chad.

The nation of Chad has struggled greatly in obtaining one of the most seemingly basic of human rights: water. The people of Chad have not been given a fair chance. It is therefore crucial for the World Bank, the UN and its entities to take charge in the water scarcity crisis affecting Chad today. Chadian families will benefit directly and immediately from the plans proposed in this paper. Remote sensing technology,

the proposed dam by LCBC, as well as the innovative agricultural practice of FMNR will do great things for Chad's recent water struggles. It is clear that these solutions should be implemented swiftly.

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