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Chad, Water
Chad: A Water Storage Solution

Have you ever been scared to drink water? Do you ever think about the potential diseases you could get just from a simple sip? This does not commonly cross many of our minds. To the population of Chad, this is an everyday occurrence. The people of Chad have to try and live without access to water, let alone clean water. To help minimize this problem, there are several actions that could be taken. These actions include: introducing new drought tolerant crops, setting up rainwater collection systems for each family, building water stations in various locations, as well as educating the public about the need for toilets.

The country of Chad is a dry semi-desert, located in Africa. The temperature averages 89 degrees throughout the day but can drop down to 50 degrees Fahrenheit at night. (“Climate and Temperature Development in Chad.”) Droughts are very common throughout the year due to the majority of the rain happening during the summer season [July through August.] During the rest of the year, rain is scarcely seen, sometimes measuring in at less than an inch. (“Climate and Temperature Development in Chad.”) Chad’s population is 77% rural. 93% of Chad's land has been dedicated to agriculture. (Chad. LandLinks, June 14, 2018). Even with this amount of land dedicated to agriculture, they still are lacking food. Many Chadians cannot read or write. The rate of illiteracy in Chad is about 70% percent among youth. The rate jumps from 70% to 75% when women reach the age between 15 and 24 (Education.” *UNICEF Chad*, 24 Dec. 2019)

Many members of the Chad population rely on agriculture to make a living. (Chad. Countries and Their Cultures. (n.d.)). Crops exported from Chad include gum arabic, cotton, and sesame. The most important crop grown is sorghum, followed by various legumes, rice, and garden vegetables. Chad is also a leading producer of livestock in Africa. The primary species of livestock raised in Chad are goats, sheep, and cattle. (“Chad - Agricultural Sectors.” *International Trade Administration | Trade.gov*,)

Typically, a family in Chad consists of five people who live in round-shaped houses made of dried clay bricks and straw. The man of the house is typically the breadwinner. The annual income for one household is around \$740, which is approximately \$14 per week, net income. (*Chad GDP per capita 1960-2022*. MacroTrends. (n.d.)) Many families have to produce their own food. The diet across Chad varies depending on where you are, but almost every meal consists of porridge and some type of vegetable and protein. Only the north part of the country has access to fish.

Since most of their population are not educated their daily routine consists of waking up, going to work on a farm, or going to work with cattle, then returning to eat and sleep. Only 10% of Chad's population has electricity available to them. (Power Africa in Chad: Power Africa. U.S. Agency for International Development. (2022, January 26)). Roads are not commonly paved throughout Chad and many families cannot afford cars. Local clinics commonly do not have the supplies they need to treat people with illnesses worse than the common flu. Chad has the lowest rate of access to safe running water and sanitation services. In the year 2020 the rate

of running water in Chad was a mere 17.4%. (Chad Access to Drinking Water, Urban - Data, Chart." *TheGlobalEconomy.com*) The country of Chad has a large percentage of its population without toilet access, 69% of the population uses open defecation, which is using the bathroom outside, and not burying any feces. Furthermore, Chad is one of 19 countries where more than 50% of the population does not have a handwashing facility and 76% percent of families can not wash their hands at home (Thelwell, K. (2020, May 24)). The open defecation and lack of hygiene creates many health concerns when safe water is limited.

Chad as a whole has many problems, but one of the biggest problems is the lack of clean, safe, water. The lake of Chad is crucial to the lives of 17 million people but has shrunk by 90% since 1960. In 1963, the surface area of the lake was 26,000 square kilometers. Now, it is only 1,500 square kilometers. (*Climate change, conflict: What is fuelling the Lake Chad Crisis*. Down To Earth. (n.d.)). Many people rely on the lake for farming, drinking water, irrigation, and fishing. The United Nations said this water issue it to be "one of the worst in the world." The increasing number of people overfishing, overgrazing, and an increase in irrigation all contribute to the shrinking of Lake Chad. If Chad were to run out of water in the lake, 80% of the population would be out of jobs.

In Chad, 57% of the population has limited or no access to food and water. (*Chad: Hunger relief in Africa*. Action Against Hunger. (2021, September 28)). This lack of water leaves people at risk for disease, regardless of their age. Women are primarily responsible for finding water to cook and clean with, which is a challenge. Children in Chad suffer from malnutrition and stunted growth due to lack of food caused by limited water.

To help combat the problem, there are many solutions that can be suggested. One, is introducing crops that require less water. Chickpeas are a drought resistant crop that require minimal water to produce a high yield. Lentils and fava beans could also introduce more protein into the diets for people that do not have access to farm animals. Collard greens, okra, and squashes are also very good drought-resistant crops. (*Drought-resistant crops and varieties - UCANR*. (n.d.) Intercropping would allow farmers multiple chances to grow a crop. Intercropping is when you grow two or more crops together. In case one does not produce as well it should, they then have another crop growing. Crops that could be intercropped and used as food for the farmers are: garlic, peppers, onions and basil would be planted in between the rows, they are natural pest repellents. Fellow farmers in Africa have been practicing intercropping for years. Soybeans and cowpeas are common crops used to intercrop in Africa. These farmers could come out and teach Chad farmers about the benefits, and how to intercrop. Having fellow African farmers talk to other African farmers would build more trust than bringing someone from a different continent. People are more likely to trust someone who what they are going through.

Chad only gets rain during the summer, so setting up rainwater collectors to collect water during the rainy period, to use during the later dry months of the year would be beneficial. All you need to collect rain water is a roof with a gutter directed into a storage container. ("Rainwater Harvesting in South Africa: Rain Water Storage Tanks." *Home Insulations*, 23 Oct. 2021) Many houses in Chad do not have what we could call a normal roof. Straw is a very common material for roof building in rural Africa, so rainwater collectors would need to be set up a little differently than the normal process. Tarps could be utilized to collect rainwater. The w

tarps could be set up between different poles and have it funnel into the collection system. If anything were to happen to the tarps it would be an easier fix than to have you fix the entire roof. In the middle of the tarp, the water would be funneled to the collection container. Collecting rain water helps reduce flooding, in times of heavy rain. These tarps could also provide shade when not collecting water.

While water has been collected, if it is dirty or has sat for a while, it will need to be cleaned. To filter water for drinking, homemade filters could be set up. (“How to Make a DIY Water Filtration System Using Sand or Gravel – Mother Earth News.” Mother Earth News – The Original Guide To Living Wisely, 21 Jan. 2022)). At the bottom of the filter there should be a small piece of cloth. After that, the next step is collecting small rocks and sand. On top of the cloth the sand and pebbles are placed. If charcoal is available, it should be mixed in that as well. Using a homemade filter would have more benefit than not having one at all. When storing water used for drinking and cooking, containers would need to have closed lids to prevent the growth of bacteria. After setting aside water for consumption the rest could be used for watering plants, personal hygiene and clothes. With water being collected at the home, women would no longer need to spend hours a day searching for water. (“Women's Water Initiative: Save the Rain.” *Save the Rain / A Clean Water Charity*, 1 Dec. 2021)).

Save the Rain is a foundation that helps set up water systems. This foundation has set up similar systems in other parts of Africa. The foundation brings out six trained women to help other women know how to build and work on water systems (“Women's Water Initiative: Save the Rain.” *Save the Rain / A Clean Water Charity*, 1 Dec. 2021)). Having water access right at home would help out every person in the household. Another nonprofit organization that could help with this problem is, Replenish Africa Initiative also known as RAIN. RAIN has a sponge city program that is based in Africa that helps teach people how to collect rainwater and how to use and store it for later use. (Our organization is all about rainwater ... - rain foundation. (n.d.)). RAIN has a three step plan they like to follow; selecting technology that would be appropriate for the situation, developing a water management plan, and developing a local financing system. (*Sustainable Catchment Planning*) RAIN could be a partner for those larger villages and cities. The first step is to set up the collection system by finding a place for the collection pipes. Setting up a water tower that the drainage pipes directly run to could be a simple solution. RAIN4Sale sets up rainwater harvesting systems and sells previously-stored rainwater to areas in need. If demonstrations were held to show how these systems work, there could be greater buy-in to the systems. These rain water systems could be used to water animals, crops, and for cooking.

Another idea that could help combat this lack of water issue would be to set up water stations in villages, utilizing the rain collection system. After setting up successful collection systems, each town could have a station in the middle of the town to use for washing their hands, filling up buckets, cups, and other water needs. Once the water station becomes well established, expanding the stations and adding more around villages, and eventually one per every household, would be the next step. The Turkiye Diyanet Foundation has already started to set up similar water stations in various African countries. (“Turkish Foundation Opens 48 Water Stations in Africa.” *Anadolu Ajansı*) Water stations would help people be able to wash their clothes, cook various foods, and be able to wash their hands regularly. Water stations would also help with the sanitary issues. People would be able to wash dishes, laundry, and themselves more regularly.

Open defecation is a large problem in Chad. Open defecation refers to the practice of defecating in fields, forests, bushes, bodies of water, or other open spaces. Every year, 297,000 children die from diarrhoeal diseases due to poor sanitation, poor hygiene, or unsafe drinking water. (“What's UN World Toilet Day?” *World Toilet*). Open defecation is also unsafe for many women because while using the restroom you are very vulnerable and exposed. No one should have to worry about anything happening to them while trying to use the restroom. In Africa the places with enclosed restrooms have lower rates of sexual abuse. (“Life-Changing Latrines.” *UNICEF Chad*, 24 Mar. 2022)).

A young Chadian set up outhouses using treated wood and letting natural decomposition do the rest. This keeps the waste from contaminating the water. If the waste has decomposed enough, farmers could use it as fertilizer for their fields. (Ngounou, Boris. “Chad: Compost Toilets to Reduce Open Defecation.” *Afrik 21*, 13 Oct. 2019) To set up outhouses you do not even need water. Toilets would help keep the water supply clean, safe to drink, and keep the users from harm. Educating local village leaders and doctors by bringing in posters that are pictorial and talking about the dangers of open defecation will help educate the public. Further down the line, they would be the ones educating the rest of the village. By lessening the amount of open defecation in Chad, the water that is available will be safe for drinking and cooking. This education will rely on pictures and word of mouth rather than written words. The message will be able to spread quickly as many Chadians do not have the ability to read but can communicate.

The circumstances that the people of Chad live in is dehumanizing and doesn't give them much hope. These solutions can improve the lives of Chad's residents, while creating a brighter future. They all work together to ensure Chadians have enough clean water for their livelihood. The need for education about water saving crops, rainwater harvesting, water filtration and the need for toilets can create healthier communities in Chad. Choosing to use water to drink or wash clothes should never be a question anyone has to ask themselves. By implementing water collection and storage, those in Chad won't have to make this choice. Educating those in Chad will benefit generations to come, as open defecation becomes less common, the water will become safer for all those who rely on it for their daily lives. These goals can be accomplished but there must be resources both from NGOs and the government invested in these solutions to make them happen.

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