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Chad: Malnutrition and Sustainable Agriculture

**Chad: Finding Solutions for malnutrition and creating a sustainable agriculture system.**

Waking up in the morning, having breakfast, and bathing in clean water are things some people in Chad don’t have the opportunity to do daily. An ordinary meal and routine is something children and adults in Chad would appreciate very much. Things taken for granted can be treasured by Chadians. Problems like hunger and malnutrition are a dilemma for many. These problems can be solved by finding sustainable agriculture methods to implement in Chad and taking action.

Chad is the center of Africa. Its capital is N’Djamena and it has 33 cities. The population it presents is 18,673,840 people, 75.6% rural and 24.4% urban (CIA, 2024). Its area counts with 1,284,000 km². The country is landlocked and is next to Libya, Cameroon, Niger, Sudan, and other countries located in central Africa. Chad is one of Africa's largest countries and the 21st biggest country in the world (World Data, 2024). The temperature in the country may vary, in the south, we can find tropical temperatures while in the north we have desert and dryness (CIA, 2024). Over the years, climate change has grown immensely and has affected many crops and food people depend on. In 2022 a rainy season entered the country and created alarming floods (UN Development Programme, 2023). More than 465,000 hectares were damaged provoking more food instability for many citizens and the destruction of their homes.

Family sizes may vary like in any country, but the average house has about 8 to 9 people (TChad, n.d.). A dwelling they have is insufficient space in their homes because they have numerous family members, and because of that they have to accommodate what they have. The typical diet most families have is based on millet, sorghum, rice, fish, meat, grains, milk, and fruits. The way they cook may vary but some options may be by frying and boiling. They provide these meals for themselves and their families by farming and cultivating.

We can find several jobs in Chad, like oil, cotton, and textiles production, sugar refining, and agriculture. The average wage is $62 per month and $740 per year (World Bank, 2012). Sadly, people are exploited and the minimum salary some people receive is 303 XAF, which represents $0.50 per hour. Because of the several economic crises families are experiencing, hunger and a lack of basic human needs are prevalent.

The biggest issue Chad presents is the malnutrition various residents suffer. This is because of the low payment and the climate change that has been interfering with the cultivation of food and the lives of several people. In the north of Chad, there have been droughts that have caused evaporation of the water people depend on. Lake Chad, the source of water most Chadians rely upon has been disappearing over the last 50 years (The Conversation, 2017). About 90% of the lake has gone and the water needed for irrigation and basic needs is now scarce. Because of this, the soil dries up and there is no possibility of planting on the land. The UN has declared the Lake Chad conflict as one of the worst in the world. The lake supported the hydration of the residents, the irrigation, the fishing, and the economic activity of the country. The poverty in the country was high but with the absence of water in the lake the population is 42% under the poverty line (World Food Programme, 2023).

As there have been droughts, there have also been floods. Previously, I mentioned that floods destroyed multiple homes and completely damaged the food that was being harvested. Just as the absence of water affected the country, the excess of it also does. Heavy rains started on the 26 and 30 of July 2022. Thirteen villages were flooded and a total of 384 households were affected and 112 were destroyed because of the incident (Relief Web, 2022). The lands and sowings were completely flooded and the crops were lost. More than 250,000 people had serious issues because of the crisis and about 155,000 people were displaced from their homes because of the incapacity there was to live in the houses.

Some of the consequences floods give to us humans are many illnesses like cholera, yellow fever, malaria, etc. (World Health Organization, 2020). Even the limited clean water resources are affected and the destruction of the crops farmed previously. The solution we could apply to avoid severe consequences from floods in Chad could be the construction of flood barriers in some crucial areas. This way crops will not seem affected because of the excess of water. Taking care of the clean water is important as well. Creating a well or a place where water is stored is important, this way no one will have an absence of clean water during the floods and they will not need to resort to the infected water that can transmit the illnesses mentioned before. Rainwater harvesting can be a great option too. With this water storage, people could water their lands and take showers. Because of this clean water resources will not seem impacted by the dirty water the floods have created. The creation of shelters can be a great idea to apply, this way people who have lost their homes can take refuge in them until they have a place to live. The refugees should be in a high location where floods should not have an impact.

Other problems that have a big effect on the country as stated before are droughts. The excess of water could lead to severe problems but the absence of it can lead to even worse consequences. Droughts are not as easy to predict as a flood and once visible effects have been seen, a drought is impossible to prevent. Ways to decrease the effects of droughts are the construction of diverse water sources like community wells, the preservation of their main water source, Lake Chad, and restricted wells which the government will have total control of. Reforestation is also a good option for water to travel back and forth on the land. Some benefits we can get from reforestation are water purification, fertilization of soil, and nutrient regeneration. This way many will have water to survive extreme droughts and some part of the water can go to the harvest and farms.

For sustainable agriculture, Chadians could start applying irrigation systems to their lands. These technologies water the plants in different ways depending on the necessity of the plant and the water it needs. Some of the irrigation systems that would give a more satisfactory result are the drip irrigation system, the sprinkler system, and the sub-irrigation system. The drip irrigation system consists of tubes that are placed near the plants and then give a portion of water depending on how strong the water flow is and how the tube is designed. The sub-irrigation system works the same way but the water is applied below the soil, which makes the water get to the plant faster and prevents it from evaporating in droughts. Lastly, for bigger crops the sprinkler system could be used, like its name says it sprinkles water to the plants and reaches long distances. With the irrigation systems, the water will be distributed in a controlled way and the production of crops will become easier. We will see changes in the agriculture of Chadians because of the effectiveness these technologies have, additionally, the way they work will change the timeline farmers have in producing crops and the farmers will now be concentrated on planting seeds and taking care of the new harvests.

Chad has a significant amount of sunlight because it is near the equator, and because of this, the application of solar panels will be a great source of energy. This way the irrigation systems work the solar panels, and even other technological systems could be used thanks to all the energy that the solar panels would be providing. The installation of the irrigation systems will depend on where the solar panels will be positioned and where the farms or crops are most likely to grow better. By installing them in that form the systems will work for a long-term period. We know this because solar panels and irrigation systems can last up to 20 to 30 years, so they will need to be replaced in an extended period of time. This way farmers will now be planting more instead of watering their crops and more food will be produced, by this Chad can achieve sustainable agriculture and a decrease in hunger may be seen.

After a drought enters Chad the soil is very arid. A way to have more nutrient-rich soil is by applying compost to it. Some benefits are the improvement of health and growth of the plant, increasement in the roots, conservation of water, an improvement in chemical nutrients of the soil, and others. As well, irrigation is very important and with the systems to water the soil and plants, the crops will end up being a good harvest. The increment of water infiltration is crucial and the education farmers should have of it is also essential. Water infiltration is the way the water enters the soil. According to Successful Farming “A lack of infiltration is one of the biggest problems facing farmers and the environment because when water fails to go into the soil, it runs off. When it runs off, it causes problems elsewhere, like flooding and nutrient loss” (2021). If farmers knew this then their plants would be healthier and fewer crops would end up dying or drying. That is why the implementation of education for farmers will improve food production, and the correct use of soil and water as well as benefits for the environment, ensuring food safety for their families and Chadians.

The main source of donations and humanitarian aid Chad receives comes from the European Union. They contributed around 56 million euros in 2023 to address humanitarian problems and help with the country's needs. The EU has granted the east side of the country 24.5 million EUR to help the communities by giving refugees and returnees (Relief Web, 2024). However, structural problems are not addressed. What is necessary is an international committee that seeks change in Chad and joins the efforts of both the government of Chad and the international cooperation that currently supports responding to the aforementioned needs of Chadians. The international committee should support Chad’s government in the construction of a public policy that guarantees Chad an improvement in the sustainable agriculture of the country. What should be included in the policy is the identification of financing needs and inviting international organizations, allied countries, the UN, and the World Bank to come and support the ideas that the committee would be giving by providing donations, ideas and spreading the situation of Chad to the world.

Even though other countries and organizations can fund Chad, their productions are very solicited in many countries. Specifically oil and cotton production. Both play a crucial role in Chad’s economy and around 2 million people depend on the income of cotton production. As for oil production, Chad holds 1,500,000,000 barrels of oil (Worldometer, 2016). The exportation of this could generate millions that could sustain the ideas expressed earlier and many Chadian lives that need support.

After mentioning many solutions that may benefit Chad, the action is what matters. If citizens support the idea and raise their voices, changes for the better will happen in Chad. The government and international organizations will cooperate to try and apply these solutions. If more people know about Chad's situation then more donations and income to proceed with improvement plans will come. We wish most of these solutions can be done so the country will start seeing changes for the better, there will be less hunger and the advancements will be noticeable. When all of these solutions are applied we will start seeing advancements in the agronomy and economy of the country. Water will be less scarce and food will be more available. We hope for the most significant outcome out of these visions and visible progress in many aspects of the country.

References:

Abdi, A. (s. f.). *Chad is the country most vulnerable to climate change – here’s why*. The Conversation. <https://theconversation.com/chad-is-the-country-most-vulnerable-to-climate-change-heres-why-78423>

AfricaNews. (2023, 22 noviembre). *Chad struggles with soaring refugee crisis*. Africanews. <https://www.africanews.com/2023/11/22/chad-struggles-with-soaring-refugee-crisis/>

*Chad accelerates its race to adapt to climate change. What’s next?* (s. f.). UNDP. <https://www.undp.org/blog/chad-accelerates-its-race-adapt-climate-change-whats-next#:~:text=Chad%20faces%20severe%20environmental%20degradation%2C%20weakened%20further%20by%20inconsistent%20rainfall,the%20rest%20of%20the%20century>.

*Chad - CA Global Chad Jobs | Africa Recruitment*. (2022, 26 Mayo). CA Global. <https://www.caglobalint.com/chad/#:~:text=Chad's%20main%20industries%20comprise%20of,Chad's%20economy%2C%20along%20with%20agriculture>

*Chad Cities Database | Simplemaps.com*. (s. f.). <https://simplemaps.com/data/td-cities#:~:text=Below%20is%20a%20list%20of,and%20other%20variables%20of%20interest>

*Chad: country data and statistics*. (s. f.). Worlddata.info.

 <https://www.worlddata.info/africa/chad/index.php>

*Chad: Floods - Jul 2022*. (2022b, octubre 26). ReliefWeb. <https://reliefweb.int/disaster/fl-2022-000287-tcd>

*Chad*. (2023, 13 marzo). Human Rights Watch. <https://www.hrw.org/world-report/2023/country-chapters/chad>

*3.4 CHAD Manual Labor Costs | Digital Logistics Capacity Assessments*. (s. f.). <https://dlca.logcluster.org/34-chad-manual-labor-costs#:~:text=As%20per%20World%20Bank%20calculation,740%20per%20capita%20per%20year>

*Chad Oil Reserves, Production and Consumption Statistics - Worldometer*. (s. f.). <https://www.worldometers.info/oil/chad-oil/>

*Chad | World Food Programme*. (2023, 31 marzo). <https://www.wfp.org/countries/chad#:~:text=Chad%20is%20a%20landlocked%20Sahelian,live%20below%20the%20poverty%20line>

*Chad - World Travel Guide*. (2019, 26 mayo). World Travel Guide. <https://www.worldtravelguide.net/guides/africa/chad/food-and-drink/#:~:text=Widespread%20staples%20include%20millet%2C%20sorghum,including%20mutton%20and%20chicken%20served>.

CIA- CHAD Atlas PDF <https://www.cia.gov/the-world-factbook/static/c4f33ab4b6fccc4bcfff1e71abf311cf/CD-Chad-atlas.pdf>

*Climate change, conflict: What is fuelling the Lake Chad crisis*. (s. f.). <https://www.downtoearth.org.in/blog/climate-change/climate-change-conflict-what-is-fuelling-the-lake-chad-crisis-75639>

*Drip irrigation*. (2014, 5 Agosto). <https://web.uri.edu/safewater/protecting-water-quality-at-home/sustainable-landscaping/drip-irrigation/#:~:text=Drip%20irrigation%20involves%20placing%20tubing,plant%20productivity%20and%20quality%20improve>.

EFY Bureau. (2023, 29 Agosto). *Solar Power Irrigation System - Advantage, potential, future*. Electronics For You. <https://www.electronicsforu.com/technology-trends/tech-focus/solar-powered-irrigation-systems>

FloodList. (2022, 6 diciembre). *Chad – Médecins Sans Frontières Launches Emergency Response for Flood Victims in “Dire Situation”*. <https://floodlist.com/africa/chad-floods-msf-emergency-response>

*Floods: How to protect your health*. (s. f.). [https://www.who.int/news-room/questions-and-answers/item/how-do-i-protect-my-health-in-a-flood?gad\_source=1&gclid=CjwKCAjwtqmwBhBVEiwAL-WAYW4vopif6IcEiyz8\_u1VM\_UghI4j2zE1Z5Ged1V2oSj9TFxM\_KxHXBoC1YwQAvD\_BwE#](https://www.who.int/news-room/questions-and-answers/item/how-do-i-protect-my-health-in-a-flood?gad_source=1&gclid=CjwKCAjwtqmwBhBVEiwAL-WAYW4vopif6IcEiyz8_u1VM_UghI4j2zE1Z5Ged1V2oSj9TFxM_KxHXBoC1YwQAvD_BwE)

Green Turf. (2021, 11 octubre). *How long does an irrigation system last? | Green turf*. <https://www.greenturf.com/irrigation-system-life-expectancy/#:~:text=your%20irrigation%20system.-,Irrigation%20System%20Life%20Expectancy,before%20it's%20time%20to%20replace>.

 2009. *Life Sciences International Journal* (1): p. 4-14. International Cotton Conference on "Rationales and Evolution of Cotton Policies", 2008-05-13/2008-05-17, Montpellier (France). <https://publications.cirad.fr/une_notice.php?dk=549551>

*Schilling, M. (2021, 6 enero). Create drought-resilient soil. Successful Farming.* [*https://www.agriculture.com/crops/soil-health/creating-drought-resilient-soil*](https://www.agriculture.com/crops/soil-health/creating-drought-resilient-soil)

*The EU announces EUR 117 million in humanitarian aid for Chad and Sudan in 2024 - Chad*. (2024, 31 enero). ReliefWeb. <https://reliefweb.int/report/chad/eu-announces-eur-117-million-humanitarian-aid-chad-and-sudan-2024#:~:text=For%202023%2C%20the%20EU%20had,doubling%20the%20initial%20amount%20allocated>.

*Virtual Chad: A look beyond the statistics into the realities of life in Chad, Africa*. (s. f.-b). <http://www.tchad.org/research/children.html#:~:text=Average%20size%20of%20a%20family,do%20they%20learn%20in%20school%3F>

*Water / Chad | Interactive Country fiches*. (s. f.). <https://dicf.unepgrid.ch/chad/water#:~:text=Chad%20has%20the%20third%2Dlowest,surface%20water%20resources%20are%20limited>

*Water, sanitation, and hygiene*. (s. f.). UNICEF Chad. <https://www.unicef.org/chad/water-sanitation-and-hygiene#:~:text=Less%20than%20one%20in%20two,cent%2C%20at%20the%20national%20level>

World Food Program USA. (2023b, mayo 15). *Chad, Africa - People in the Country Are Suffering from Mass Hunger*. <https://www.wfpusa.org/countries/chad/>

Zhu-Barker, X., & Steenwerth, K. L. (2018b). Nitrous Oxide Production From Soils in the Future. En *Developments in psychiatry* (pp. 131-183). <https://doi.org/10.1016/b978-0-444-63865-6.00006-5>