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Latrine Construction: The Key to Addressing Eritrea's Water Crisis at its Roots

Despite efforts to be alleviated, Eritrea's water crisis continues to grow along with its multidimensional impacts on the livelihood of Eritrean citizens, including the spread of fatal diarrheal diseases, heightening the rural-urban divide, and inequitable access to education. While prior efforts to mitigate this crisis have served as essential strides towards a solution, the key is to address this issue at its roots through comprehensive latrine construction.

Eritrea is quite a diverse country, and its cultural traditions are richly unique. The country is located on the Red Sea, in what is often referred to as "The Horn of Africa": in more colloquial terms, Eastern Africa. While Eritrea may not be a country that immediately rings a bell for most global citizens, over 3.124 million inhabitants call this robust nation their home(["Eritrea"](#)). Eritrea is currently a sovereign nation, but it was most certainly an uphill battle and did not occur without a three-year-long battle for independence. Eritrea's coastline boasted an essential trade route that many large, national powers hoped to seize. Due to this, Eritrea was under the control of Ethiopia and gained independence in 1993. The start of this battle for independence is commemorated with joyous festivities each year on September 1st by proud Eritreans across the country, a holiday known as Start of Armed Struggle Day. Today, Isaias Afwerki holds the presidency, elected under Eritrea's parliamentary government system(["Political Structure in Eritrea"](#)).

Eritrea's geography & topography is characterized by abundant coastlines and deep valleys. The nation also boasts a surplus of distinctive natural resources, including barite, copper, feldspar, fish, gold, kaolin, potash, salt, and zinc(["Eritrea"](#)). These coastlines measure about 2,234 kilometers long and border the famously hot & salt-filled Red Sea. Surprisingly, however, the majority of the nation's land is not suitable for the cultivation of crops - only 5% of the country's land is arable(around 966,000 acres), and permanent crops are planted in just 0.03% of this land(["Country Profile: Eritrea" 5](#)). Eritrea holds the title of the African country located at the highest landmass, and these highlands are blessed with fertile soils that are essential to Eritrea's agricultural industry. A wide variety of crops are grown in these areas, ranging from peas, chickpeas, and beans to wheat, barley, and maize([Leipzig 5](#)). This infertility in other areas is primarily linked due to the lack of rainfall in the area, in fact, in some regions of Eritrea, such as the city of Massawa, annual rainfall can be reported at levels as low as 205 millimeters. Oftentimes, the unreliability of Eritrea's rainfall can be damaging to the precious crops of Eritrea's farmers, leading to subpar harvests. Unfortunately, these harvests have often resulted in food production not being able to keep up with the country's rapid population growth. The fusion of Eritrea's arid environment with an average annual temperature of around 85 degrees Fahrenheit results in a generally tropical, desert-like climate. However, differences in climatic conditions can be observed throughout the year. The hottest

periods can be observed from June to September, whilst Eritreans experience cool, damp weather from December to February. On the highlands, however, these climatic conditions can be much more extreme, with temperatures as low as the freezing point([“Eritrea: Climate”](#)).

Eritrean families typically live together in what is known as “nuclear families”: a family consisting of two parents, and all of their children. However, many different ethnic groups inhabit Eritrea, and some of these groups traditionally live with extended families. Along with this range of ethnic groups comes a range of unique languages that are spoken by Eritrean citizens - in fact, there are over 9 ethnic languages spoken. While all nine languages are equally respected within the nation, the primary languages are Tigrinya & Arabic. The traditional cuisine eaten in Eritrea is enough to make anyone’s mouth water. A few of these unique dishes include “injerra”, which is a pancake-like bread, often eaten with the spicy sauce “tsebhi”. The Eritrean diet also consists of strict food customs & restrictions. Both major religions practiced within Eritrea, Islam, and Christianity, observe periods of rigid fasting - these periods are known as Lent and Ramadan respectively. On the other hand, many religious celebrations occur throughout the year as well, where the exact opposite of fasting occurs - feasting! These feasts consist of plentiful, tasteful beverages and roasted ox, sheep, and goat([“Countries and Their Cultures: Eritrea”](#))

While there are many different ethnic tribes & religions within Eritrea, the livelihood of Eritrean families is fairly stagnant across the nation. Over three-quarters of Eritrean workers work in the agricultural industry in subsistence farming, while the rest work as either traders or workers. While workers make around 81,960 Eritrean Nakfa(the USD currency equivalent of \$5464) per year, a large majority of Eritreans live in dire poverty. Consequently, over 53% of the nation’s population live under the poverty line, and the country ranks 76 out of 108 on the UNDP Human Poverty scale([“Health Action in Crises” 1](#)) The immense poverty that Eritrean inhabitants unfortunately face contributes to a myriad of issues within its society including food security and malnutrition, which is demonstrated in a variety of surveys that have been conducted in the country. These studies have found that almost half of all children(44%) in Eritrea suffer from chronic malnutrition([“Health Action in Crises” 1](#)). The fatal health impacts of malnutrition are even further magnified when examining the insufficiency of health-care services in the area and the lack of access to immunization and antenatal care(Health Action in Crises 2). Furthermore, unfortunately, many children do not have equitable access to education: in fact, UNICEF found that over 27.2% of school-aged Eritrean children are not enrolled in school([“Eritrea Overview: Basic Education”](#)). While all of these problems contribute to the alarming state of the Eritrean country, the water scarcity & sanitation crisis that the nation is currently facing has had immense repercussions throughout the country.

To provide a basic understanding of this issue, as of 2020, over 80.7% of Eritrean citizens lack access to basic water services([“World Vision Worst Access to Clean Water”](#)). Despite efforts from UNICEF and various non-profit organizations, only moderate progress has been made towards the goal of attaining access to clean water for the Eritrean people (Eritrea: Water, Sanitation, and Hygiene). Regardless of Eritrea’s moderate rainfall, as previously mentioned, this rainfall is often unpredictable, leading to torrential floods. The vast variation in the rainfall patterns can often lead to decreased access to water. However, there are a plethora of other reasons that contribute to this water crisis in Eritrea, one of the

primary reasons being the current unsanitary conditions of the waste systems within the country. Studies have discovered that over 85% of Eritrea's population utilizes improper sanitation facilities, which oftentimes leads to fecal & bodily matter ending up in local water sources. Additionally, as a direct result of this, it was found that 40% to 90% of water supplies were contaminated([“Speaking About the Problems of Water Quality in Eritrea.”](#)). The devastating immediate effects are not surprising. The lack of access to clean water in their homes often leads to Eritreans looking elsewhere for sources of water. Lamentably, these sources are more often than not public water sources such as rivers, lakes, and streams, leading to the contamination of these essential areas. This deadly contamination can lead to fatal diarrheal diseases within children, which is the leading cause of death for children under the age of 5 in Eritrea([“Eritrea's Lack of Clean Water.”](#)).

However, it's important to dig deeper into the impact of Eritrea's water crisis that may go beyond the surface level. There are many other challenges that this water crisis presents to the Eritrean people that are often overlooked. Oftentimes, rural dwellers in Eritrea have less access to clean water than those in urban areas. To illustrate this, only 16% of rural populations have access to water sanitation facilities, demonstrating the heightened challenges presented in these areas([“Eritrea: Water, Sanitation, and Hygiene”](#)). Furthermore, an in-depth analysis of this water crisis reveals that women, young women, in particular, are disproportionately affected by this water crisis. During periods of menstruation, access to clean water is necessary for girls to utilize proper hygiene practices. Oftentimes, in absence of these resources, young girls are forced to skip school for the duration of their period, leading to unequal access to education. While these periods may only occur for a week or so at a time, their monthly recurrence often leads to Eritrean girls falling behind in their education([“Why Periods Are Keeping Girls Out of School”](#)). Furthermore, this issue often affects the nation's ability to strengthen and rebuild after natural disasters. Many major industries in Eritrea rely on access to clean water, notable examples being agricultural industries, which require water to sanitize & clean their harvested crops, and local businesses that also require water to sanitize products, especially during the COVID-19 pandemic([“Eritrea's Lack of Clean Water.”](#)).

When planning methods to aid Eritreans across the nation and alleviate the country's dire water crisis, it is essential to re-examine the root cause of the issue. As previously mentioned, a primary contributor to the lack of clean water in Eritrea is the unsanitary waste and sewer systems. Before diving into innovative solutions to aid this crisis, it's also important to investigate what has already been done in Eritrea, and what can be improved upon within these courses of action. Organizations such as UNICEF have initiated programs such as the WASH program in Eritrea, which promotes proper sanitation habits in schools through encouraging important hygiene practices such as hand-washing and provides menstrual products for young girls([Ofori-Kuma 1](#)). While this initiative is certainly incredibly effective in aiding communities impacted by diseases and the inability to practice proper menstrual hygiene due to Eritrea's water crisis, this aid can only be retained for a short term, and it may not be as sustainable as looking into re-vitalizing the waste and sewer systems in the nation, which are the root of the insufficient sanitation of the country's water sources.

In addition to this initiative, however, UNICEF has also been working towards constructing rain-water reservoirs, and connecting schools to these community water supplies. While there has certainly been a fair amount of great non-profit work in the area to combat this crisis, there have also been astounding local efforts to aid suffering Eritrean communities. The Red Cross Society of Eritrea built a sub-surface dam in Baiwa, a busy village in Eritrea. This dam cleaned its contents with a natural sand filter, ensuring the quality and sanitation of the water. It was designed to ensure the safety of all residents of Eritrea when utilizing water, whether it be for cooking, showering, etc. Not only did this project aim to decrease the risks associated with drinking or using water, but it also aimed to improve the capacity of water that the village's water well could store, allowing for elongated usage and more water resources to spread around the community ("[A Long-Term Solution to Eritrea's Water Shortage](#)"). While the meticulous planning and thought that went into the plan was certainly well worth the effort and provided a solid source of water for the villagers of Baiwa, Eritrea's climate adds a bit of complexity to the plan. As previously discussed, Eritrea's rain patterns are quite unpredictable, and can greatly vary from month to month, along with great variations from region to region. While this dam may be sustainable in certain months in certain parts of Eritrea, it may not be as sustainable in areas with too heavy, or too light, rainfall.

While all of the initiatives that have been discussed are certainly important steps towards eradicating Eritrea's water crisis, there are certain actions I would recommend to improve upon these prior projects and efforts. As previously mentioned, unsanitary waste and latrine systems in place are the main underlying factors that influence the rampant contamination within Eritrea's water sources ("[Speaking About the Problems of Water Quality in Eritrea](#)"). Unfortunately, usage of ill-constructed, improper toilets or outdoor defecation can lead to bodily matter seeping into the ground, oftentimes resulting in the contamination of local groundwater. This same groundwater is later used in Eritrea's daily lives, resulting in deadly diarrhoeal diseases that claim the lives of a staggering amount of Eritrean children annually ("[Eritrea's Lack of Clean Water](#)"). To truly solve this issue, it is essential to take control of this issue right at its roots, which is the lack of proper latrine facilities in the area.

In addition to the afore-mentioned rain-water reservoirs that have been constructed by UNICEF & other local non-profit efforts such as the Red Cross Association of Eritrea, I recommend that proper, sustainable toilet/latrine constructions be installed across Eritrean communities, with careful consideration to siting and sizing of the latrines. My solution consists of pit latrines that can be readily made by Eritrean citizens at an appreciably low cost. Currently, a concern with pit latrines is the bacteria that can have a negative impact on health and wellbeing. Systematic reports have found that to combat this issue, measurement accuracy and criteria for siting latrines should be improved upon ([Graham 521](#)).

Therefore, to prevent this widespread issue of contamination of groundwater, the bottom of the pit should be above the water-wells to prevent wastage seeping into the clean water. The World Health Organization has recommended that when building pit latrines, the bottom of the latrine should be measured at least 2 meters above the groundwater, and at least 15-30 meters from drinking water sources ([Brikke 105](#)). Rather than continuing to let this fecal matter seep into the ground and endanger the lives of Eritrean citizens, these latrines would ensure the purity of the local groundwater. Furthermore, organizations such as the Global Water Initiative have suggested that pit latrines should be lined with reinforced concrete bricks, which can be created by Eritrean citizens through a mixture of cement, sand, and water. ([Nikeima 9](#)).

Lining the latrines with concrete blocks will provide for reusability, rather than constructing a new pit latrine each time one is filled.

These latrines would instate a clear distinction between water used for wastage and local groundwater that would now be able to be safely used for farming, businesses, and the local day-to-day tasks of Eritrean inhabitants. All inhabitants will benefit from the execution of this solution, as clean water will be more readily and safely accessible to all Eritrean residents across different ethnic communities, tribes, and neighborhoods with the widespread construction of these latrines.

To ensure that this project will be sustainable and successful in Eritrean communities, Eritrean citizens must be given proper training and are educated on proper maintenance practices for the latrines. Fortunately, organizations such as the Global Water Initiative have published open-access comprehensive maintenance guides for families to follow when building pit latrines. These guides contain guidelines for recommended practices when utilizing the latrines, lining the latrines, and emptying latrines, including environmentally sustainable practices such as using old wastage from latrines as compost ([Nikeima 19](#)). To carry out this vital task of educating the community, help could be sought out from non-profit organizations in the area. One such organization is the Eritrean Development Foundation, which actively works with Eritrean communities to facilitate resource development in the area ([“About the EDF”](#)).

The World Health Organization estimates that a ventilated communal pit latrine can cost a minimum of \$70, including the cost of labor, materials, and transportation of materials ([Brikke 108](#)). While larger, global organizations such as the United Nations that are working towards Sustainable Development Goal 6 of “Ensure access to water and sanitation for all” (“[United Nations Sustainable Development Goals](#)”) will be needed to provide funding and oversight, this project will need to be managed and led on the local level. The United Nations targets spending for meeting SDG 6 at about \$114 billion per year until the year 2030 ([Gutton 3](#)), some of which can be utilized towards the current crisis in Eritrea. Thankfully, as previously mentioned, a local effort is already being put in from Eritrean non-profit organizations to facilitate aid with suffering communities - acquiring help from the Red Cross Association of Eritrea, and similar non-profits in the area, this latrine construction can be carried out efficiently.

In addition to these incredible organizations, consistent cooperation from the local community will be essential to the sustainability and success of this solution. Eritrean communities must work towards keeping the newly constructed latrines clean and in good condition. To ensure accountability, sustainability, and cleanliness, government legislation & policies can be enacted to place fines against damages caused to the latrine facilities.

Eritrea is often referred to as “Italy in Africa”. But beneath this rich, lively exterior, is a deadly water sanitation crisis that has and will continue to claim the lives of many without significant reforms. While there have been several efforts in the area that have played an effective role in alleviating the water-related issues that Eritrea faces, significant progress still needs to occur. The construction of clean latrines with distinct pipeline systems throughout the Eritrean nation will be key in nipping the issue right at its roots.

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