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Somalia, Sustainable Agriculture

### **Growing Solutions Through Decades of Droughts**

Grocery store shelves are completely empty, turning your faucet spits dust into a bone-dry sink, families use the sidewalk as their home waiting for an ounce of food to feed their starving children. This is a picture of what modern America could look like if we faced just a few years of a severe drought. In Somalia this has been their reality for multiple decades. Millions of children suffer from severe malnutrition without anyone there to help, family's entire livelihoods are only memories of another generation as over seven million livestock have been wiped out, and political instability runs rampant across the country forcing over two million families to become displaced. Somalia doesn't just need a bandage to cover up the problem but instead systematic solutions.

Somalia is located in the eastern most point of contiguous Africa, otherwise known as the Horn of Africa. Its climate is dry, with two rainfall seasons (which its agricultural sector is highly dependent on). Somalia's geography is mountainous in the north, and in the south, it is flat with plains and rugged thornbush semideserts. Somalia's government is a Federal Parliamentary Republic but has recently faced political insatiably and violence (Somalia Country Profile, 2023). Its estimated population is over 17.1 million people with over 53% living in rural areas. Somalia currently uses 70.3% of its land for agriculture, but only 3% is under cultivation and only 1.8% is arable (Qlik Sense, United Nations, 2023). Somalia's biggest crop producers are corn, beans, sorghum, sugar, and bananas. The average farm size in

Somalia is approximately three acres or just over the size of two American football fields. (World Food Bank, 2021).

Somali families are generally large with multiple generations, possibly all living under the same roof.

Typical dwellings rely on their economic status, in urban areas people usually live in flat-roofed houses made of cement or brick, with iron sheet roofs. In rural areas, Somalis live in traditional dwellings called "mundals." These dome-shaped huts are made of materials such as mud, sticks, and grass thatch.

Regardless of the type of dwelling, Somali houses are often decorated with colorful fabrics and traditional handicrafts, such as woven mats, baskets, and pottery (Somalia, *Countries and Their Cultures*). Somali families typically eat dishes such as "Bariis," made with aromatic spices and meat. Availability of this nutritious food is often limited, particularly in rural areas, where many households rely on subsistence farming and may struggle to access markets (Decker, USDA). Malnutrition is a major problem in Somalia, with rates of almost 40% suffering from stunting, wasting, and undernutrition among children (Federal Government of Somalia, 153, 2020). Poverty and elevated levels of unemployment mean that many people cannot afford to purchase food, specifically protein rich foods and vegetables. Somalis average wage depend on their location and profession. Access to necessities and services in Somalia is often limited and dependent on location, with those living in urban areas generally having greater access than those in rural areas due to affordability. This includes access to aspects including clean water and sanitation, electricity and communications, and roads and infrastructure. Similarly, access to education and healthcare in Somalia is limited. Progress for greater access is often affected by conflict and instability in Somalia which has led to its current state of crisis.

Sustainable agriculture takes on different meanings for different people. In developed nations, the phrase sustainable agriculture refers closer to the concerns of conservation of a resource or the environment while maintaining economic balance. But in developing countries like Somalia, sustainable agriculture addresses the droughts the country has faced in recent years and seeks to improve farming methods that would allow the land to sustain continual agriculture. Because these issues have not been addressed

Somalia has been facing the most severe threat of starvation it has ever seen. According to Famine Early Warning Systems Network, 2022 on page 14 it states, “most regions in Somalia (13 out of 18) have populations in Emergency (IPC phase 4), reflecting the widespread impacts on household food security.” It goes on to also state that projected 2.1 million people will be in “Emergency” for food security levels. Children are affected greatly as found by Federal Government of Somalia, “Malnutrition starts to manifest at three to four months of age, ... stunting starts to rise and peaks at 6 months, with a prevalence of 38 percent.” The severity of not having sustainable agriculture creates a ginormous ripple effect that hurts countless aspects of Somali society and culture regardless of rural or urban areas.

First, solutions to water management are needed. Agriculture is prominent in the southeast region of Somalia which is also where two major river systems flow. For years there have been efforts to try to use this water to irrigate the land around rivers, however, with no water management, poorly built irrigation systems, and conflicts over water this has not been effective. Man-made canals were proposed to allow more water to be utilized by farmers in the southeastern region and with proper irrigation systems could have allowed for more than 100,000 hectares of land to be irrigated (World Food Bank, 16-22, 2018). This is where the issue lies, proper quality irrigation systems have not been built and farmers who are stuck on their traditional farming methods will not implement new irrigation systems due to past failing systems. This is where subsurface drip irrigation systems can help. Reich explains with Colorado State University extension in 2014 that a subsurface drip irrigation system works by installing pipes below the topsoil in the root system zone of the crops. Water seeps out of the pipe in all directions only where seed is planted. The pipes are placed six to twenty-four inches below the soil depending on the soil type and crop in which you are irrigating. Because crops root systems stretch farther down than weeds the subsurface irrigation system will not aid in weed growth. These systems work best in arid, hot, and windy climate zones with little to no water supply which Somalia suffers from. Subsurface irrigation eliminates almost any water from evaporation on the surface. Because they are subsurface, they are not subject to wearing down due to the climate.

Second, using the right methods while farming is vital to ending food security risks. Reduction in soil loss or long-term environmental degradation is not feasible options for small farmers to easily adopt when their immediate concern is simply feeding their families. Implementing subsurface irrigation systems is a start on the right path but showing the correct fertilizers to use, crops to plant, and how to upkeep systems is vital for farmers to know. A recent discovery of using soil microbes has led to more environmentally safe practices. Researchers and farmers are coming to find that microbes in the soil can drastically change its health. If certain nutrient solubilizing bacteria are introduced in the soil through fertilization methods, then soil fertility and water retention will dramatically increase (Ramasamy, Chapter 1, 2020).

Biofertilizer is living and does not leach into other freshwater sources, meaning it is very environmentally safe and sustainable. Biofertilizer's composition aids in capturing nutrients through phytohormone production, phosphorous solubilization, siderophore production, as well as enhancing the potassium solubilizing bacteria already in the soil. Biofertilizer creates a symbiotic relationship with plants and improves its overall health and yield. This is much different than applying synthetic fertilizers like in America where we are seeing how reliant crops have become to provide proper nutrients. If synthetic fertilizers are used in Somalia, we will not fix the issue we will simply continue to exasperate the soil of nutrients and delay an ever-growing issue. Soil and its microbes are there to provide those nutrients so why not promote it? Incorporating biofertilizer with the irrigation system would allow the bacteria to be directly transported to the roots of the crops allowing the symbiosis to take place much quicker in the growing season. By introducing nutrient producing bacteria to nutrient absent soil, we can create farmland. This could revolutionize the composition of soil in Somalia and dramatically increase the mere 1.8% of arable land that the country has available (Qlik Sense, United Nations, 2023). All while allowing for a more environmentally sustainable way of farming and exceeding the needs of growing food demands.

If sustainable agriculture practices are not implemented, Somalia will see degradation of resources, loss of biodiversity, environmental pollution, and more malnutrition and death. But it will not just take the

Somali government to implement programs that change this systemic issue. By partnering together an American university or government to provide the idea and funding and the University of Somalia to implement it, we can educate farmers on the conditions of their soil; emphasizing the long-term consequences of their traditional methods of agriculture and helping develop appropriate farming practices that benefit the environment. By showing the farmers of Somalia how to build their own subsurface irrigation system and apply biofertilizers that improves soil health, fertility, and retention we can end the food security crisis. The Somali people are tired of outside sources coming in with empty promises. Going through a local university builds trust with Somali farmers. By using a mere fraction of our governments spending we could grant the University of Somalia the funding to kick start a country wide education program on these sustainable agriculture practices. One donation is all it would take. From an individual standpoint Somalians should research in areas to promote their own soil health by talking to their local university or government. As for us in the United States we should also stress to our government that there are ways for us to help. We can save a hurting population, by giving people wonderful tools of knowledge they can produce wonderful things.

## Works Cited

- Decker, Jennifer. "Eating Habits of Members of the Somali Community: Discussion Summary." USDA.
- "Developing Countries and the Future of Small-Scale Agriculture." *Developing Countries and the Future of Small-Scale Agriculture*,  
<https://basis.ucdavis.edu/developing-countries-and-future-small-scale-agriculture>.
- Famine Early Warning Systems Network. "Unprecedented Drought Brings Threat of Starvation to Millions in Ethiopia, Kenya, and Somalia." 9 June 2022.
- Federal Government of Somalia, with support from the United Nations Population Fund, Somalia and key donors. *UNFPA Somalia*. 2020,  
[https://somalia.unfpa.org/sites/default/files/pub-pdf/FINAL%20SHDS%20Report%202020\\_V7\\_0.pdf](https://somalia.unfpa.org/sites/default/files/pub-pdf/FINAL%20SHDS%20Report%202020_V7_0.pdf).
- Lewis, Ioan M. "Somalia." *Encyclopedia Britannica*, Encyclopedia Britannica, Inc., 29 Mar. 2023,  
<https://www.britannica.com/place/Somalia#ref37715>.
- Marshall, Elizabeth, and Steven Wallander. "Farmers Employ Strategies to Reduce Risk of Drought Damages." *USDA ERS - Farmers Employ Strategies To Reduce Risk of Drought Damages*, 2017,  
<https://www.ers.usda.gov/amber-waves/2017/june/farmers-employ-strategies-to-reduce-risk-of-drought-damages/>.
- "Qlik Sense." *United Nations*, United Nations,  
[https://dashboards.un.org/public/sense/app/a7b6751e-e00d-44a3-b88a-01c60b890e2c/sheet/db436456-d930-45f7-bf11-4d2d951e5984/state/analysis?\\_ga=2.119929676.593617597.1679428596-997519232.1679428596](https://dashboards.un.org/public/sense/app/a7b6751e-e00d-44a3-b88a-01c60b890e2c/sheet/db436456-d930-45f7-bf11-4d2d951e5984/state/analysis?_ga=2.119929676.593617597.1679428596-997519232.1679428596).

Ramasamy, Murugaragavan. "Role of Biofertilizers in Plant Growth and Soil Health." *Nitrogen Fixation*, vol. 11, IntechOpen, London, UK, 2020.

Reich, D., et al. "Subsurface Drip Irrigation (SDI)." Colorado State University Extension, 2014.

"Somalia - Hunger Relief in Africa." *Action Against Hunger*, 8 Nov. 2022,  
<https://www.actionagainsthunger.org/location/africa/somalia/>.

"Somalia Country Profile." *BBC News*, BBC, 21 Mar. 2023,  
<https://www.bbc.com/news/world-africa-14094503>.

"Somalia." *Countries and Their Cultures*, <https://www.everyculture.com/Sa-Th/Somalia.html>.

World Bank Group. "Preventing Famine in Somalia by Supporting Sustainable and Resilient Drought Recovery." *World Bank*, World Bank Group, 11 Nov. 2019,  
<https://www.worldbank.org/en/results/2019/11/11/preventing-famine-in-somalia-by-supporting-sustainable-and-resilient-drought-recovery>.

World Food Bank. "Rebuilding Resilient and Sustainable Agriculture in Somalia." Food and Agriculture Organization of the United Nations, 2018.