

Devin Franzen  
South Winneshiek High School  
Calmar, IA  
Somalia, Factor 2

### **Somalia: Managing Water Scarcity and Adapting Water Conserving Practices With Irrigation**

“Unless someone like you cares a whole awful lot, nothing is going to get better. It's not,” (Seuss). That is what the Once-ler said to the boy when he gave him the last Truffula seed in the Dr. Seuss book, The Lorax. The same care that the boy must take with the last Truffula seed must also happen with the water supply in Somalia. There is a very limited amount of water in Somalia and it must be used in ways to help get the most of it. That can be done though managing the water scarcity and adapting water conserving practice with irrigation.

Somalia is located along the horn of Africa. Its western border runs along the Indian Ocean and it is bordered by Ethiopia, Kenya, and Djibouti. Somalia has about the same amount of land as Texas but only 1.6 percent is arable land. The climate in Somalia is mostly desert with irregular rainfall (United States Central Intelligence Agency). Beside the problem of only a little bit of arable land, Somalia also has many governmental problems. Somalia has not had a functioning government in over twenty years, and for the past eight years Somalia has a transitional government. There are also multiple self-declared states and governing bodies in Somalia. Those governmental and environmental problems have put a strain on the water that is available in Somalia. In addition to the significant problems caused by government instability, Somalia faces several other challenges.

Somalia is made up of four major clans, the Dir, Daarood, Isaaq, and the Hawiye. These four clans make up 85 percent of Somalia's population. There is no clan that has more power than the others. Their alliances with each other determined whether the clan was powerful or not. These alliances changed as time went on and wars occurred between them. These wars were about who would control the water sources of the area (Metz).

The typical farming family in Somalia has five members, a father, a mother, and three children. They grow millet (similar to wheat that can grow in harsh climates), beans, sorghum, and corn. Since homes are only big enough for sleeping, food is prepared outside over a fire of wood or charcoal. The major religion in Somalia is Islam. Muslim population in Somalia makes up almost 99 percent of the population. They don't eat pork or drink alcohol because of their Muslim faith ("Somalia").

The education for children in Somalia is almost nonexistent after the civil war. Siad Barre, the leader of Somalia for 20 years before the governmental collapse, started a campaign to improve literacy in Somalia but nearly all the work of that campaign was erased with the civil war that followed the collapse. Before the civil war the educational system of Somalia was similar to the educational system of the United States. During the civil war a lot of the schools were bombed and most the teachers left for other jobs. There are still a few schools left but teaching materials are limited ("Somalia").

There are doctors and hospitals, but they are few and far between. There are many unqualified people that work in the health care services. Another problem in Somalia's health care system is the lack of regulation of prescription drugs. Due to the lack of this regulation, drugs are often prescribed improperly. Most health care in Somalia is free. However, there are some hospitals and clinics that charge a small fee to help keep costs down ("Somalia").

There are many barriers to improving agricultural productivity in Somalia. But, one of the most significant barriers is the lack of a government. The lack of a government makes it difficult for aid

organizations to work in this country. There is corruption and criminal activities that jeopardize their safety. A permanent government in Somalia can be achieved with continued pressure from the international community. For an example, in February of 2011 the Transitional Federal Government (TFG) of Somalia had voted to extend its mandate for a permanent government. They wanted to postpone the permanent government establishment for three years, but the international community opposed the extension. The TFG then changed its mandate for the permanent government so that it would coincide with the international community proposals. The first elections will be in August of 2012 (United States. U.S. Department of State). The government in Somalia would also continue to become stronger with more troops and resources at its disposal so that the government would have more control over the surrounding the warlords. Also if the United States and the international community could to send aid to Somalia at the request of the Somali government, the people of Somalia would put more trust in their government to provide for their needs.

Another barrier to improving the agricultural productivity is the need for markets in Somalia. There are very few markets that offer good prices for farmers to sell their crops at. That could be fixed with better communication and better roads (Pyrtel). It could also be improved by making the transportation of the goods safer. A strong government would help with that problem.

There are many reasons why growing crops in northern Somalia is difficult. In the last years of the Siad Barre regime, the government stole or destroyed all of the water pumps in northern Somalia that were in the cities or villages that were controlled by the Somali National Movement. In the rural areas they made the wells unusable by dumping dead animals or engines in the wells, this polluting them. Those wells had to be abandoned and the people that used them had to use and still use water that is of poor quality or buy costly clean water (Muthusi, F. M., G. Mahamud). Most of the country is classified by the Somalia Water and Land Information Management (SWALIM) as arid or semi-arid. Another problem with the growing of crops in northern Somalia is that the water evaporates faster than it falls (Muchiri). The arid climate and evaporation rate make it very hard for crops to grow in northern Somalia. There are better growing conditions in southern Somalia. The government still contaminated and destroyed their wells, but the weather is more helpful in the growing of crops. There are more rains and the growing period is longer than it is in the north (Muthusi, F. M., G. Mahamud).

The biggest problem that will continue to make it difficult to grow consistent amounts of food is a problem that is uncontrollable, the amount of rainfall. The rainfall in Somalia varies a lot. For example, from 1963 to 1990 the average rainfall was 584 mm, but in 1977 the average was 800 mm (Muchiri). Also the Potential Evapotranspiration (PET) is very high, from 1,000 mm. to 3,010 mm. That creates at least a 200 mm deficit, that slowly will lower the amount of water in the ground. There are only a few months out of the year when the PET is lower than the rainfall and those are the few months when they can grow crops (Muthusi, F. M., M. W. Mugo).

At the moment, in Somalia there is enough food. That is because the last harvest in Somalia was a very good harvest, which was in February. That was due in part to the good rains they had and the amount of aid that went into the country during the beginning of the planting season and during it. The harvest was "200% of the post war average" (FSNAU). That harvest was out of the normal and a harvest that good is not expected to happen during the next growing season. In October of 2011, the harvest was so bad that farmers were thinking about moving to the cities.

*"I was contemplating to move to Dadaab with my family since we did not have any food in our store due to failure of rains last season and we had no other source of income to survive (Hassan)"* (Foxbatt).

Even in the parts of Somalia that get enough rain for the growing of crops, there are still people starving. The Food Security and Nutrition Analysis Unit (FSNAU) still classifies those parts of Somalia as not

having enough food. The FSNAU gets its information from organizations working in the country and its own work in the country. They then use all the information to get an idea of what the problem is like in Somalia.

There are ways to provide more food and water for Somalia. The best ways are by adapting water reducing farming practices and managing the usage of that water. The water reducing farming practices should be done by improving the irrigation technologies and using better conservation practices.

The better the limited amount of water in Somalia is managed, the better off the people are. They will be able to grow more crops with the extra water when they learn to manage the usage better. Somalians can also spend more time doing other things with their time than getting water. The lack of water in some places is so bad that the Somalians “sometimes have to walk hours to get water” (Abdulrahman). If a family doesn’t use the amount of clean water they have wisely they will have to buy more, which would put them in debt and make it hard for them to buy seeds for the next growing season, or they have to use very low quality water. That low quality water is usually shared with animals. Sharing the water also increases the chances of getting a waterborne illness from the “transmission of faecal pathogens” (Muthusi, F. M., G. Mahamud).

The irrigation practices in Somalia are very primitive at places and more advanced at other places. This is due primarily to how much money a family has. Most of the irrigation in Somalia is done along the Juba and Shabelle rivers. Along those rivers there are many different types of irrigation that are used. The different types are pump fed, gravity fed, and river flooding for the irrigation. The risk of a crop failure also increases as more area is irrigated and the less reliable the form of irrigation is. The small pump fed farms irrigate an area of one half hectares to five hectares (*Somalia. Rep.*). They are used to grow cash crops. The medium sized farms use gravity fed irrigation to grow between five to ten hectares of cash crops and staple crops (*Somalia. Rep.*). The larger flooding farms use the bi-annual flooding from the rivers to grow their crops. When the floodwaters recede the farmers plant their crops. They mostly grow staple crops because it is very unpredictable way to grow crops. The river may flood again before they get the crops out (*Somalia. Rep.*). In the autonomous state of Puntland (which is on the horn of Africa) in Somalia, irrigation from wells are used. They get the water from shallow aquifers to irrigate their crops. Those shallow aquifers usually are one of the first water sources that dry up because there is not a lot of water in them (Muthusi, F. M., G. Mahamud).

The amount and size of the pump and gravity fed irrigation farms should be increased. The pump and gravity fed irrigation systems are the least susceptible to the yearly changes in the climate. The farmers along the rivers can also get better yielding crops because they are fed by water from the rivers throughout the growing season. The pumps for the pump fed irrigation farms are expensive but the benefits outweigh the cost. The farmers can grow crops that they get higher profits from. Also the pumps that are already in Somalia could be converted into pumps that run on solar panels, this way the farmers don’t have to buy gas to run their pumps. The biggest problem that would have to be overcome with using solar panels is that they require trained professionals to serve them, but an organization could be set up that would train Somalis with the skills that they would need would solve that. Also with the training that the Somalis would get they would be able to solve some of their other problems like money, health care, and education. With gravity fed irrigation there would still be water getting to the crops throughout the growing season. There are also more things that could go wrong with this type of irrigation. The water level in the river could go down, then the canals would have to be dug deeper so that the water continues to flow through them.

There is another type of irrigation that is not currently being used in Somalia is drip irrigation. Drip irrigation is better than other types of because it doesn't lose as much water to evaporation when compared to other types of irrigation. It doesn't lose as much water because it releases water directly to

the roots of the plants, that would decrease the amount of water that the farmers have to use. The downside to the drip irrigation is the that it is very expensive to build and cost a lot to keep it up and running.

Another way to increase the amount of food production is with more organizations for farmers (like the Farm Bureau in America). With that organization farmers would be able to communicate and better plan their planting and harvest. An organization like that would also help farmers get equal and higher profits for their crops by using better storage. One organization already in the Somalia that is based on the farmers is the SATG (Somali Agriculture Technical Group). The SATG has helped farmers by teaching the farmers which type of Millet is the best for growing in Somalia. It is also helping farmers and advisors get in touch with each other so that the best decisions can be made. It has also helped with teaching farmers about what is the limiting factor is (it is phosphate) and ways to better store the crops until they have sold them (SATG). The SATG could also work to develop a low rain fall type of seed that would be able to survive the frequent drought that affect the Somali region.

There are many different organizations working in Somalia to help with the water management and improving the farming practices. A few of those are the Zakat Foundation of America, Oxfam, and the SATG (Somali Agriculture Technical Group). The Zakat Foundation of America has been helping to bring water security in Somalia for 3 years. They have helped bring water security to Somalia by building wells and providing aid to people who need it. They have field researchers that go around the country looking for places that could support a well. They then test to see were the best place to put the well is and build it (Abdulrahman). Oxfam is helping by providing seeds, tools, and technical skills. In one part of the Juba region they helped prepare land for 50 families (Foxbatt).

Better managing water scarcity and adapting water conservation practices in Somalia would help reach the Millennium Goal of decreasing the number of people that go hungry (*Millenium Development Goal Tracker*). Better managing the usage of water in Somalia would give more people access to safe water that they can use to drink and to provide water for irrigation. The farmers in Somalia would be able to grow crops for themselves and grow enough of a surplus so that they could fed the rest of their country.

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