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Somalia, Factor 5: Climate Volatility

Somalia: Drought-Resistant Crops to Combat the Effects of the Famine

As the demand for food increases, farmers often face the difficulty of feeding the rapidly and exponentially growing population. Often, their greatest efforts are not enough to feed the people in their respective areas or countries; this task is especially tough for farmers in developing nations. These farmers are further impacted by natural disasters which hinder them from growing successful and healthy crops. The natural causes can range anything from droughts to floods to earthquakes. Droughts, specifically, lead to low crop yields, poor soil quality, and increased susceptibility to disease. The negative impacts of drought are also economic; businesses can fail and the nation's overall economy can plummet. Because the lack of money results in an inability to purchase food, the serious problem of readily accessible food for the population is created.

Somalia, located in East Africa, is part of the Horn of Africa and has much of its borders along the coastline. Somalia is home to a population of 10.5 million people in 637,657 square kilometers ("The World Factbook: Somalia"). Circumstances in Somalia are problematic, and Somalia faces food crisis from drought; the crisis is evident, with a shocking 73% of the population in poverty. As a result, the average life expectancy is 54 years and is ranked 176th out of 183 countries ("About Somalia") ("Table of Health Statistics by Country, WHO and Globally"). In the past quarter of a century, Somalia has suffered from its lack of a functioning government and for its being a violence-torn country ridden with famine and poverty. 31 years after the formation of Somalia in 1960, President Barre was overthrown by clans that opposed his socialist policies, and ever since, the country has not recovered from warfare and chaos. In 1992, the United Nations called for two UN Operations in Somalia, but they withdrew after three years due to lack of success and attacks on them by the Somali militia. Since then, multiple peace initiatives have been attempted, all which have had little to no success. The Islamic terrorist group, al-Shabaab, has taken over most of Somalia. The Somali area not taken over by al-Shabaab, Puntland, has declared itself an autonomous state; having a stable government and a president, Puntland is looking to reuniting with the rest of Somalia to again be a single state ("About Somalia").

The average Somali family has seven to eight children. The men and women commonly get married at a young age; marriage at 14 or 15 is considered average. A man can have up to four wives, as said by traditional Islamic culture. Having more wives is an indicator of a man's status, so the practice of multiple marriages is usually reserved for the elite (Lewis). Literacy and unemployment rates are bleak, with only 31.8% of adults literate and 67% of the youth unemployed ("About Somalia"). Fortunately, in more recent years, education rates have tripled in both Puntland and Somalia, and the rate sits at around 33% ("Somalia"). Health care remains inadequate, with only 39 certified doctors per one million Somali people ("Somalia").

Agriculture is a significant part of Somalia's society. A typical Somali diet consists of a combination of Somali and American foods; the American side of their diet was introduced when the United States aided Somalia during the food crisis. The most important component of a Somali meal is the meat; rice and vegetables are also often included (Decker). 10% of all Somali land is considered sufficient for agriculture, but only 3% of it is cultivated as farmland ("Beeraha"). The farms range from 2 to 30 hectares, and the average farm size is 4 hectares ("Livestock and Agriculture"). The most popular food crops include maize, barley, and sesame, but Somalia often has weather fluctuations, so a common practice is to also raise a smaller scale of crops less susceptible to failure such as groundnuts and beans ("Beeraha"). Somalia is primarily known for its livestock exports, which constitute 60 to 65% of its gross domestic product ("Beeraha") ("Livestock and Agriculture"). These animal exports include sheep, goats, camels, and cattle. Constituting 91% of all livestock exports, sheep and goats are the major shipments ("Livestock and Agriculture"). As a result, the economy is largely dependent on the agriculture and

livestock, and a shortage of either can be greatly detrimental to Somalia's economic stability and connections with other nations.

There are times when food production is meager and recovery is slow. During these times, the populace suffers from food shortages, thus raising the poverty percentage and causing chaos within and outside of the country. Famines are not uncommon, and they impact areas all around the world but have a greater impact on third-world and developing countries that do not have the proper resources and political management to combat them. Famines are caused by a number of factors and are not solely the result of a lack of food. A common cause of famine is drought, which directly correlates to low crop yields and increased food prices, killing a large fraction of the population. Additionally, famine can be caused by political conflict which causes rifts in the process of food production. A population can also grow too large for farmers to feed; a lack of acknowledgement to people's hunger and calls for help leads to famine as well ("Famine in Somalia: Causes and Solutions"). In Somalia's case, the famine primarily sprouted from series of droughts; droughts are frequent in Somalia, and the weather is rather unpredictable. Somalia faces political reasons for the famine as well. When President Barre was overthrown and the clans took over, Somalia was thrown into a violent conflict and torn apart by war, and has not recovered since ("About Somalia"). The lack of political settlement has prevented steady food production as the violence limits attention to agriculture, limiting crop yields ("About Somalia"). Somalia has faced external political conflict which has also greatly inhibited recovery from the famine. The extremist group al-Shabaab took control of Somalia and thus intercepted some resources sent by other nations and international organizations. The diversion of food by Al-Shabaab caused the United States, one of Somalia's greatest benefactors, to withdraw their aid for the Somali people to prevent opposition from obtaining food. As international organizations saw the United States' actions, they followed suit in fear and under the pressure of conflict with the United States. The UN has withdrawn a portion of their aid, but they have taken larger part in Somalia's government, stabilizing areas of the country ("About Somalia").

Somalia is prone to drought. Being a naturally arid land with little and irregular rainfall, droughts have plagued the country in the past and have left their mark. Droughts became more and more common in the 1970s, but Somalia remained agriculturally self-sufficient through the 1980s. As political unrest rose in the early 1990s, a massive famine hit Somalia, and Somalia was in a chaotic state and was unprepared to recover quickly. The Somali famine of 1992 resulted in 250,000 deaths and plunged the country into further chaos, tangled in political issues, famine, and drought (Chossudovsky) ("Somali Famine 'killed 260,000 people'"). The cause of the 1992 famine was not drought as much as it was politics; after the rise of the clans, the new leaders and terrorist groups targeted the Bay, an area known for its flourishing crop yields and for being the center of agriculture, and used farmers' food against them as a weapon and led them and the population to starvation. Since the 1990s, Somalia has been unable to recover from the recurring droughts; because of this, droughts began to significantly take part in the consequent famines (Samatar).

In Somalia, farmers have typically dealt with unpredictable weather changes. Though these changes may slightly impact food production, the impact does not usually result in massive numbers of deaths. However, in 2010, a significant drought dried up Somali farmers' resources. Unable to irrigate the crops, farmers produced a very low crop yield during this time. Livestock, often considered the most important part of food production in Somalia, died off. What food that was produced quickly became very expensive and triggered agricultural inflation. Because farmers during the drought had no crops to sell and because few could afford the food because of the high price, farmers received low income from their work and were often unable to support themselves ("History and Causes of the Somali Famine").

Feeding the population is not the only part of combatting a famine; the responses of the government and of international organizations are equally integral for a quick recovery. When the drought and famine hit Somalia, it suffered from a massive response failure from both its government and international sources. At the start of the famine in the 1980s, Somalia was entangled in a civil war and therefore did not have a functioning government to respond to the crisis ("History and Causes of the Somali Famine"). However,

Somalia did not receive much international support, either. In 2011, the UN declared the famine in Somalia as a Stage 5 situation, a situation where “more than two people per 10,000 die each day, acute malnutrition rates are above 30 percent, all livestock is dead and there is less than 2,100 kilocalories of food and 4 liters of water available per person per day.” However, the response was too late; by the time the state of emergency was declared, half of the casualties had already happened (“Somali Famine 'killed 260,000 people'”).

Since the famine that hit recently in 2010, deaths have been steadily rising. In a short, two year span from 2010 to 2012, almost 260,000 people died, making the famine worse than the last significant famine, which happened in 1992. Though the famine impacts all people, it has a particular impact on children because they are less developed and often malnourished. The 2010 famine caused around 4.6% of the total population and a tenth of the nation’s children under five to perish (“Somali Famine 'killed 260,000 people'”).

The large drought that occurred in 2011 has also had a significant impact on the population. The drought has wreaked havoc on the country and continues to worsen, impacting more than 13 million people. Tens of thousands of people have either been displaced or have left their dwellings in search of adequate food (“Somali Famine 'killed 260,000 people'”). The impact of the drought is widespread; 40% of the Somali people are in need of urgent help. Despite this urgent need, it is predicted that there will not be much assistance and the country’s aid will remain in a poor state. In response to this prediction, the UN’s Humanitarian Coordinator in Somalia Peter de Clercq has said that 58,300 children will die if they are not met with immediate assistance (“Somali Drought Leaves '50,000 Children Facing Death'”).

Somalia’s staple crops include millet, rice, and maize, among multiple others. These grains constitute a part in almost every Somali’s meal and are key parts of their diet (Lewis). The recent droughts have had a severe impact on these food crops and prevented both the growth of the plants and the health of the Somali people. Droughts in Somalia have a long term effect on plants; many die off and it is difficult to reverse the actions due to the fact that the drought is ongoing and has lasted for multiple seasons. More scientifically, there are various ways where a plant’s roots can die. The plant can experience inadequate moisture and dry up, as in the case of Somalia’s crops. The plants can also die from the roots’ improper functioning which prevents them from absorbing water. Overwatering, ironically, can also kill; the excess water can drive oxygen out of the soil and leave the plants deprived of nutrients (Small).

There may be a solution to the issue with food production and dying crops. In the past decade, scientists have been experimenting with genetically modified plants to make them drought resistant. These plants combat the problem of climate volatility because they can withstand any weather irregularities, which are common in Somalia. An introduction of these plants can significantly raise crop yields and lower the 73% poverty rate (“About Somalia”).

However, few actions have been made to aid Somalia. The seeming neglect is a result of the violence and political outrage within Somalia that prevents outside resources from helping the country recover. The United States has given up and withdrawn all support from Somalia, and the government they attempted to build before exists in a dilapidated and corrupt state (Mohamed). Most countries and organizations pour their efforts into aiding the nearby countries that are also suffering from drought and part of the Horn of Africa: Kenya and Ethiopia. As a result, many Somali are fleeing to refugee camps in these countries in search of assistance (Boyer and Templeton).

Somalia’s massive food crisis has not yet been solved. And because Somalia is not being aided, the hugely potential benefit of drought resistant crops is not available for its citizens. Though these crops have not reached Somali soil, they have been tested in Kenya and Ethiopia. The countries, being alike in geographical location and atmosphere, would have near parallel test results. In the case of an outside organization being able to get past the violence in Somalia and delivering the seeds to the citizens, Somalia’s famine problem would be greatly aided.

Ethiopia, also a part of the Horn of Africa and in a severe drought, has been receiving aid. The Drought Tolerant Maize for Africa (DTMA) Initiative has genetically engineered seeds to be able to withstand less water and still be able to produce larger crop yields. Ethiopia has had great access to genetically modified maize seeds and fertilizer. From this support, the maize area of growable farm land grew from 14% to 40% in nine years, and fertilizer use doubled from 16 kilograms to 34 kilograms per hectare. The impacts of this aid are visibly represented by the harvest; the overall crop yield increased by 10.5% (Abate and Shiferaw). The engineering of this crop is seemingly complicated but is actually simpler than thought. The desired gene from the DNA of a crop is removed and inserted into the seeds of the target plant. For drought resistant crops, additional traits include faster and more productive photosynthesis, root structure complexity, and a decrease in rate of transpiration, thus limiting the burden placed on the earth's resources to produce food ("Genetically Modified Crops").

Opponents of drought resistant crops have questioned their safety and use. These plants, due to their mass production, are usually more susceptible to disease. The potential impact from the disease is immense because it will be able to spread quicker and farther, causing mass devastation and a possibly even greater dependence on food. Additionally, mass producing a food through genetic modification causes no variation in people's diets ("Genetically Modified Crops"). However, the DTMA has overcome both of these impending problems. The farmers will not be solely dependent on one type of crop; other types of plants, such as , will be produced in a hybrid, drought-resistant form to cause more variation within one's diet and to diversify one's crop fields to reduce susceptibility to disease. Also, additional genes are inserted into the DTMA's seeds which make them resistant to certain pests and diseases. The plants are immune to the maize streak virus, which in the past has reduced crop yields and caused plant stunting and prevented ear formation and grain filling of affected plants ("Maize Streak Virus").

There have also been accounts of a different kind of drought-resistant plant. Researchers in Israel have been studying plants and engineering them to be drought resistant. A Professor of Biology at Technion University in Israel, Shimon Gepstein, left a batch of hybrid lettuce plants unwatered. Afterward, he cut the lettuce and saw that the hybrid lettuce took 21 days to brown, while normal lettuces went brown in less than a week. These plants also require less water than traditional plants, needing only 30% of the water usually required. These plants, dubbed "superplants," can be minimally watered for an entire month and still make produce. Questions often arise about the safety of genetically modifying a plant and whether it can have a significant and detrimental impact on humans. Professor Gepstein notes, "Our plants are not dangerous for human health, because we have altered them using their own components, they have nothing added to them." He has also mentioned that these crops can greatly aid countries stricken by drought such as Somalia, Ethiopia, and Kenya (Avraham).

The research behind drought resistant plants is global, as people attempt to rekindle the influence of the Green Revolution. Two of the world's largest agricultural companies have focused their efforts on engineering plants, specifically food plants, that can survive and produce even in low rainfall. One of the companies, Monsanto, has engineered a drought tolerant corn called DroughtGard. After trials of testing and research, Monsanto proved that the corn, under dismal conditions and very little water, thrived and produced a greater crop yield than healthy, traditional crops. The other major agricultural company, DuPont Pioneer, has reverted to breeding, unlike Monsanto's use of genetic biotechnology. DuPont Pioneer's corn, called AQUAmax, breeds target plants with specific traits in order to produce the ideal, drought resistant plant (Stecker). These plants have a 7% higher advantage for a successful yield in water-limited conditions ("Optimum AQUAmax Products").

Both of these companies' corns have been developed primarily to aid the United States' drought crisis in the Midwest. However, with the success of this crop, DuPont Pioneer has shipped AQUAmax to locations all over the Middle East and Africa, including Kenya and Ethiopia; AQUAmax has been available to Ethiopians since 1990, and Kenyans have had access since 2000 ("Middle East and Africa"). Noticeably, although made available to multiple countries in Horn of Africa, DuPont Pioneer has not made AQUAmax seeds accessible to Somalis.

Somalia has received aid in the past, but due to inner turmoil, terrorist violence, and civil war, many countries and organizations have retreated and avoided helping its people. In a time of immense need, it is currently receiving minimal support. In the past, makeshift governments and organizations have been set up by the United Nations and the United States, but after leaving Somalia, these efforts have been taken over by al-Shabaab and gone corrupt. In present day, Somalia stands in a destitute state of poverty and famine, riddled with violence, new threats from an emerging terrorist group, ISIS, and the ever-impending doom of drought (Mohamed).

Additional action for Somalia is imperative. The crops that are successfully thriving in Ethiopia and other parts of Africa must be transported to Somalia in order to directly aid the food crisis there. World hunger is not the responsibility of the country itself, but rather the outside nations' and organizations' responsibility to aid the country's people and make sure that food is accessible to all. The United States and United Nations must resupply their line of aid and not let fear of terrorism prevent the much needed support from reaching the people.

There are multiple, smaller organizations around the world that seek to aid Somalia and the drought-stricken countries of the Horn of Africa. World Vision has teamed up with UNICEF to create the Horn of Africa Food Crisis Fund, which primarily aids children who suffer from severe malnutrition and access to food and clean water (Boyer and Templeton) ("Progress at Risk in the Horn of Africa"). UNICEF states that among the countries in the Horn of Africa, Somalia requires the most urgent help. With UNICEF's and World Vision's help, great impact has been made to treat the Horn of Africa's food crisis. UNICEF has delivered 31,500 tons of food, treated 1 million malnourished children, and immunized 1.5 million children in Somalia ("Famine Causes and Global Response to Help Protect Children"). Though progress is clearly visible, it is not enough; more support is needed to fully combat food crisis in the Horn of Africa ("Progress at Risk in the Horn of Africa").

There are alternative, less direct options to aid Somalia. Puntland, the northeast part of Somalia which has declared itself a single state in the past and has a stable government and leader, is looking to reunite with the rest of Somalia as a single state ("About Somalia"). Puntland, being in the Horn of Africa, is also suffering from the drought, though significantly less than Somalia. Ali Mohamed, the co-founder of the Horn of Africa Freedom Foundation, states the importance of aiding Puntland during this drought. Aiding Puntland would not only create a stable state in an area with chaos, but it would also create peaceful, diplomatic ties between Puntland and organizations and countries around the world such as the United Nations and the United States (Mohamed). And because Puntland is now looking to reunite with the rest of Somalia, the United Nations and United States can effectively aid Somalis without having to withdraw out of fear of violence.

Dr. Norman Borlaug once said, "Food is the moral right of all who are born into this world." Despite this, well into the 21st century, millions and millions of people around the world still do not have secure access to food and water. As a result, people, including young children, are dying from malnutrition and starvation. Somalia is one such country facing an extreme case of famine and drought. In the present situation where aid should be imminent and immediate, Somalia faces an aid deficiency due to international fear of the civil war, terrorist groups, and undeniable peril within the country. The nations and organizations that have withdrawn from Somalia must resupply their aid lines in order to ensure that this food, this moral right can reach the suffering people who need it most. Access to food is essential; only once it is secured can a person, a community, a country grow to its full potential.

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