Kenna Asche
Fillmore Central High School
Geneva, NE
Kenya, Factor 1 Plant Science

Kenya: Saving the People

Imagine waking up to the sound of livestock outside. You sit up in your cold, rock hard bed, then get up and notice the rumbling sound coming from your unfed stomach. Then you realize you can't even remember the last time you ate. In all reality the livestock have eaten more than you have. For most people in the United States we do not have this problem because of food sustainability. Food sustainability is "When all people at all times have access to sufficient, safe, nutritious food to maintain a healthy and active life" (The World Food Summit). Many Americans take our well-nourished bodies for granted. Over 1.3 million people (Muraya) out of Kenya's total population of 48.46 million (World Bank) are facing starvation. Many people in Kenya today would not know what it feels like to be full and nourished. These Kenyans, who are facing starvation, would be lucky to get at a small plate of food per day. Farmers in Kenya often face the struggle of having most of their crops die due to the arid and dry conditions. When the rains actually do come, the amounts are insufficient to sustain the crop through maturity. The farmers do not have basic agricultural inputs, training, or updated technology. Kenyan farmers also lack adequate financial services. These same farmers depend on livestock to feed their families. The climate in Kenya is unpredictable and harsh; because of this, farmers don't know when to plant crops. The reasons stated above affect Kenya in many different ways. Agriculture is the backbone of the economy in Kenya. Agriculture employs more than 75% of the workforce and accounts for around 51 % of Kenya's gross domestic product or GDP (Feed the Future). The population in Kenya is growing by 1 million people per year. This growth is the main cause of food scarcity. Only 20 % of land is able to grow crops. In order to help save the 1.3 million people who are at risk of starvation due to the persistent and unforgiving drought-like conditions in the arid Kenyan climate (Ombok), the Kenyan government and other countries as well need to help come up with a plan to save these people from dying of hunger. In order to help Kenya with food sustainability, it is necessary to provide background information about the average Kenyan, describe the major problems facing Kenya, discuss how to help the starving people in Kenya, and examine the future of agriculture in Kenya.

In Kenya the average size for a family is five people per household (Bauer). The diet of most Kenyans consists of ugali, which is a popular maize based dish. It is commonly served with chicken, goat, beef, fish or vegetable stews. This dish is typically prepared on a wood-powered stove. Alternatives to operate the stoves are being encouraged in order to save wood and reduce deforestation. Their snacks include mandazi, a doughnut served with coconut, cinnamon or ginger; samosas, small triangle shaped pockets filled with meat or vegetables; and chapattis, similar to pita bread, which can be eaten as a snack or with stew. These things are usually prepared in the morning and eaten warm for breakfast or cold later in the afternoon. Kenyan's also enjoy miniature kabobs. Their idea of a feast is a giant pile of nyama choma, or barbequed meat. In 2003, the Kenyan government gave a free primary education for all elementary school children. In 2008, secondary education also became free. As a result, nearly 3 million more students were enrolled in primary school in 2012, and the number of schools has grown by 7,000. From 2003 to 2012, the secondary enrollment numbers increased from 43% to 67%. Although many students are now able to go to school, there are those that don't due to many reasons.

Children that live in rural areas are more likely to not attend school compared to urban children simply because of the lack of schools in rural areas and the proximity of the students to the schools in the rural areas. Social economic status can also affect the enrollment rates, further hindering the disadvantaged Kenyan youth (Onyango). While people are dying of starvation some are also dying due to disease and health issues. An estimated 1.6 million people have HIV. There is also an extreme risk of getting a disease such as hepatitis, malaria, and typhoid. In Kenya there is a shortage of medical workers all over the country. Kenya has just one doctor and 12 nurses/midwives for every 10,000 people. Medicines are not free and many poor families often go without treatment when ill. Only 30 % of Kenyan's have access to improved sanitation and 60 % to clean water (InterNations). A third of Kenyan children under age five are stunted and are more than 15 % are underweight (Our Africa). The farm size in Kenya is less than 2.5 hectares or 6.2 acres (Banks), compared to the average farm size of 434 acres in the United States. Crops grown in Kenya include tea and coffee sorghum, millet, sweet potato, cowpea, pigeon pea and maize. Kenya is also very involved in horticulture. Horticulture employs over 2 million Kenyan's. The animals raised in Kenya are cattle, goats, sheep, pigs and poultry (Our Africa). They are also involved in dairy farming. Agricultural technology is not something that is commonly found in Kenya. The average Kenyan farmer only has 6.2 acres of land, so farm equipment is not necessary. However, advancements in irrigation technology could be helpful. The work that is done by the farmers is all done by hand. The lives of the farmers are not very easy because of the outdated and inefficient farming practices.

There are many barriers facing the typical family in Kenya. Major barriers include climate change, lack of extension services and soil nutrient deterioration. The climate has affected Kenyan farmers in many different ways. The unpredictable rain seasons affected the ability to plan their farming activities. This is important because of the dependence on rain-fed agriculture. Extension services also cause a barrier to Kenyan farmers. The extension service is extremely important to farmers because they spread knowledge about new technologies and other agricultural information. The service helps transform subsistence farming into a more modern agricultural system to advance household food security, improve income and reduce poverty. The reason this is a barrier is because the extension agent to farmer ratio is 1:1,500. Because of this, farmers are not as technologically advanced as they could be. The extension agent like position will be needed in highly populated areas to educate people on how their food is being produced. Genetically Modified crops or GM crops are currently illegal in Kenya due to the GM crops being seen as unhealthy when a genetically- modified-maize-consuming rat had a tumor. Only later was it discovered the genetically modified maize wasn't the cause of the tumor. However, the government wasn't convinced and put a blanket ban on import, sale, distribution and consumption of GM crops in Kenya (Zhu). Even the United States has problems educating highly populated area's about GMO's and agriculture in general. The continuous cultivation has caused a depletion of soil nutrients. This caused crop yield to go down and the environment to deteriorate. In order to help the soil nutrients the farmers need to become educated on the right farming practices to help restore the nutrients in the soil so future generations may be able to use the same land (Kibet). The farmers could also educate other farmers on correct farming techniques in order to help keep the land fertile. Each year 800,000 young adults in Kenya are unable to find work due to the fact that they are not experienced enough for the work force. The overall unemployment rate is 10 %, while 80 % of unemployed Kenyans are below the age of 35 years old (Omolo). There are different barriers to adequate nutrition in Kenya. For example, in Kitui, a county located in the Eastern Province, is prone to droughts. The crops there often fail. No one can grow the necessary food needed to feed an infant or young child. During a long dry season there are no fresh foods available. Vitamin A, zinc and iron deficiencies are the highest in the entire country. Stunted growth affects 29 % of children aged 6-23 months in this area. In

Marsabit, the largest county in Kenya relies on livestock for 80 % of their livelihoods and household food security. Fruits and vegetables do not exist in the diets of the people in this area. Given in the examples stated above, you can see that the main reasons why many Kenyan's don't have adequate nutrition is simply because the climate is arid in most parts of the country and not a lot can be raised or live there (Vark).

There are many factors that could help solve Kenya's food sustainability, such as sustainable agriculture and demographics. However, the factor that would help Kenya's food sustainability the most would be plant science. By increasing crop yields and breeding plant varieties with drought resistance Kenya's people would not only have food sustainability but also adequate nutrition as well. Most of the country of Kenya is dry and arid; by genetically modifying plants to grow through a drought would be a major help to all people. An analysis of multiple cases found that genitally modified crops increased yields by 22 %, reduced pesticide use by 37 %, and increased farmer profits by 68 %(World Economic Forum). As stated previously, the counties in Kenya rely on livestock for most of their food. During The Green Revolution all of the other countries around the world were advancing farming practices while the continent of Africa was not. Because of this they are behind in many farming and conservation techniques, compared to East Asia and the Pacific whose yields quadrupled between 1960 and 1990 (World Economic Forum). As a result, African farmers are still doing all of the work by hand without fertilizer or irrigation systems. If farmers in Kenya were given crops that were drought resistant and could produce more yields there would be fewer people going to bed at night hungry and malnourished. A positive outcome of this would be that families would be able to make more money by selling the crops that usually die due to drought. By having the country of Kenya use GM crops there will be more food and less malnutrition. However, this could be a while until the government takes away the blanket ban that prohibits the importation, sale, distribution and consumption of GM crops. Until that time Kenyan farmers can use irrigation if it is available along with pesticides. Studies have shown that irrigated farms have ai90 % higher yield than rain-fed farms (World Economic Forum).

Although introducing GM crops into Kenya won't fix all of the problems it will fix a majority of them. Farmers from Kutui, Kenya had the opportunity to plant drought resistant crops given to them from Farm Africa. As a result yields doubled and the farmers were able to learn current farming practices (Farm Africa). So far six training sessions have happened. In the sessions they show local farmers how to conserve water and use soil saving techniques. They were also shown how to add value to produce and how to correctly market their produce. The farmers are now able to sell their surplus at a local market. These sales have helped Kenyan farmers earn more money to support their families (Farm Africa). Although it is great to see a community become so successful there are still millions of people in the country who are still struggling with food security. Considering that the drought resistant plants worked in Kutui, Keny these crops will continue to rise throughout Kenya and many other countries that are facing the same problem. If these crops are spread throughout the country there may be some problems to follow. If nobody dies due to starvation the population will grow even faster than it already is. The farmland is so scarce in Kenya the way it is. In order for this not to happen there needs to be a well thought out plan in order to prevent this. To effectively address this factor Kenya will need a plan to make sure that the country itself can handle it. If more food is being produced will other people have enough money to buy the produce? The list of questions could go on forever, but if drought resistant crops helped one town it could help the country itself. Another suggestion to help Kenya doesn't have anything to do with plant science itself. When farmers eventually start using drought resistant crops, they should practice crop rotations and no till farming to keep the

land fertile. The Farm Africa project that took place in Kutui, Kenya is one project that could be scaled up successfully. If this project would be scaled up successfully, with a lot of planning, it would help save millions of people from starvation. If the national government in Kenya wants to help out their people, then they should take action and allow the farmers in Kenya to use GMO's. Although, Kenya's National Biosafety Association has recently allowed Monsanto's genetically modified corn to be tested. They will test the corn to see if it is safe to use and whether it has any nutritional value (Siegel). Until that day comes farmers can use pesticides and irrigation to increase their yields. However, even these practices can have consequences such as, not conserving water, dealing with runoff, and even causing pollution if the fertilizer isn't applied or handled properly. Communities can work together like the town of Kutui did and start practicing good farming techniques. People in many communities are probably very tired of being hungry and having most of their crops die, so why shouldn't the government allow people to use GM crops? The typical family can implement my recommendations by being good stewards of the land and by practicing crop rotation and no till farming in order to keep nutrients and moisture in the soil, along with being an advocate for agriculture.

As you can see, there are many factors that lead to food security. Kenya has a lot to offer the world as they provide twenty-one percent of tea, thirteen percent of cut flowers, and six percent of coffee (Kenya Trade). Kenya has been fighting food security for a long time. While agriculture makes up 75% of the economy in Kenya, there are still some major problems with it. In order for things to change, Kenya's government should allow genetically modified drought resistant crops to be used. In order to feed the extra 1 million people per year something must be done in order to advance farming techniques. Whether that be educating farmers on up-to-date farming practices or introducing drought resistant crops to the entire country. If drought resistant crops were introduced there would be less people going to bed hungry and less malnourished people. By introducing this new form of plant science, farmers would be able to harvest more yield and be able to financially take care of their family. Although the size of most farms in Kenya is only about 6 acres, the farmers will need to use all of it to help support their family and country. Genetically modified drought resistant crops would solve most of the problems in Kenya but not all of them. In order to be able to keep the land fertile they must use smart farming practices such as no till farming and crop rotations. Other factors such as sustainable agriculture and demographics could also help solve food security in Kenya. Over 1.3 million people are facing starvation. As stated before food sustainability is "When all people at all times have access to sufficient, safe, nutritious food to maintain a healthy and active life" (The World Food Summit). Many people around the world take their full stomachs for granted while others in Kenya are barely surviving. In the small town of Kutui, Kenya there was a perfect example of how a small group of people can make a large impact. This is what the rest of the country should do. Kenya should start thinking of future generations and start conserving the farmland in Kenya by using current farming practices such as no till farming and crop rotation. In order to help Kenya with food sustainability, it is necessary to understand background information about the average Kenyan, solve the major problems facing Kenya, how to promote solutions to those in need, and how we can work together to ensure the future of agriculture in Kenya.

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