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Caring For Kenya

Imagine living in a country where ethnic clashes break out daily, where 31% of the population is undernourished, and around 5.6 million are defined as 'food insecure' (World Food Programme). Sub-Saharan Africa is the only place in the world where the per capita food production has remained the same for over forty years ("Low-tech Methods Improve Crop Yields"). As a result, twenty percent of all children in Kenya fewer than five years old are underweight. Kenya has an infant mortality rate of 79 infants per 1000 infants born alive (World Food Programme). In 2005, The United Nations Children's Fund (UNICEF) reported that Kenya's child malnourishment number had nearly doubled in three months. One factor causing this extreme malnourishment is the high number of livestock death. Cattle are essential to Kenyans, but 40% of cattle are lost because of lack of water or food (O'Brien). Rain is scarce in Kenya, making it difficult to effectively grow crops. Technology is low in most areas, with little to no machine or animal power. The average Kenyan makes \$1240 per year (World Food Programme). This low average annual income makes it difficult enough for them to buy enough food for themselves, let alone their livestock. These factors all contribute to Kenya's food insecurity. World Food Prize defines food insecurity as existing "when people are undernourished as a result of the cost or physical unavailability of food and/or inadequate nutrition." ("The World Food Prize Global Youth Institute"). This means that in Kenya, most do not have food everyday and have a large fear of starvation. All of these problems in Kenya cause questions about why they are occurring. Although countries all over the world have been donating money and resources to Kenya, they need to solve their environmental and financial problems to produce enough food for themselves. UNICEF and other organizations have donated a great deal of money to Kenya. In 2005, UNICEF alone donated 140,000 malarial treatments, 150,000 mosquito nets, and \$4.5 million dollars (O'Brien). Even with all of these provisions, there are still people dying from malaria and malnutrition every day. Kenya desperately needs help increasing the amount of food and money available to its citizens. In order to achieve this, research is being done to find ways to implement new technology and increase the amount of resources Kenya has available. The goal of this research is to improve the overall situation in Kenya and, more specifically, to decrease the food insecurity present there. It is necessary to learn more about the environment and lifestyle of Kenya before conclusions can be made on how to make the needed changes.

Kenya is located in sub-Saharan Africa, with a capital city of Nairobi. Kenya has an extremely dry climate with poor soil fertility in the majority of the country. There are three major regions in Kenya: the tropical coastal area, the dry plains area, and the fertile highland. The tropical coastal area is hot and humid, around 27 degrees Celsius and receives an average of 40 inches of precipitation per year. The dry plains area receives ten to thirty inches of rain per year with an average temperature of 21 degrees Celsius, causing this area to be very low in population. The third region of Kenya is the fertile highland. This is less than one-fourth of the land area of Kenya, but 75% of the population lives here. The temperature is around 19 degrees Fahrenheit and gets an average of 40-50 inches of precipitation per year. The Great Rift Valley divides the highland into east and west portions. This valley has the most fertile soil. The two main rivers in Kenya are the Athi and the Tana, going from the highland to the Indian Ocean.

In Kenya, one-third of the economic production is from agriculture. Most rural farmers raise both crops and livestock, sometimes growing enough to sell (World Book). Common livestock raised in Kenya includes cattle, pigs, and chickens (World Food Programme). Kenyans are split equally between growing cash crops and subsistence crops. Important cash crops grown in Kenya are coffee and tea; cashews, cotton, pineapple, and sugar cane are also grown. The estates that grow cash crops are usually very large, from 100 acres to 5000 acres. These estates employ people both full-time and part-time (World Book). Large estates are responsible for around 30% of total agricultural production (Kinyua). Most farmers own

land or rent land from the government; with the majority of the population being small farmers. Most farmers have from two and one-half acres to 50 acres. The main subsistence crop is corn, but other subsistence crops include bananas, beans, cassava, potatoes, sweet potatoes, and wheat (World Book). These small farmers are responsible for around 70% of the country's total agricultural production (Kinyua). Modern equipment has been making its way slowly into Kenyan farming, but the majority of farmers still use traditional tools. Many farmers also have part-time jobs to help raise more money for the family. Part-time jobs include blacksmiths, carpenters, shoemakers, tailors, or working on the large estates that grow coffee and tea. Three percent of the population are nomads, only caring for livestock.

Most families have six or more children, as a large family is greatly valued in Kenyan culture. The women mostly take care of the children and help with the planting and harvesting. Housing for most rural farmers are small huts with dirt floors and thatched roofs. Cotton is used for clothing, with the men wearing cotton shirts and pants and the women wearing cotton dresses. Kenyan children are not required to go to school, but 80% receive at least elementary education. There are both government funded schools and privately funded schools. The number of schools in Kenya has been increasing due to increased demand. There are also three universities in Kenya.

Kenyans have other problems in addition to the food shortages. Less than one percent of Kenyans own cars, but the towns and farms are very spread out from water sources. This makes gathering water for farming and families very difficult. Only one-fifth of the land in Kenya is suitable for farming. The result is that the food production and availability cannot keep up with the large population growth (World Book). This leads to severe malnutrition and poverty. The problem of food insecurity is affecting other aspects of Kenyan life as well. The conflicts that are occurring over scarce food resources are killing many Kenyans per month and increasing daily. In 2008, the total number of people killed in conflicts was 364. In 2009, the number killed this year has already reached 209, compared to 116 in June 2008 (United Nations). Houses and towns are being burned in these conflicts, therefore worsening the environmental state in Kenya as well. In order to help combat these problems, organizations are attempting to decrease food insecurity and malnutrition by improving hygiene and nutrition, increasing purchasing power and food access. These projects will help an estimated 6000 families if successful (United Nations). The programs include research in crop biology and agronomic technology to find ways to increase yields from crops and to improve drought and disease resistance, therefore increasing food production.

There are other factors that are leading to the food insecurity in Kenya. The poor quality of soil and low precipitation make it very difficult to properly grow crops. Farmers are at an even greater disadvantage because of their lack of modern technology to overcome the environmental challenges in Kenya. Roads are also a large hindrance in Kenya. The infrastructure of roads is not sufficient for transportation. The lack of roads throughout sub-Saharan Africa is a huge obstacle for both development and transportation of food and other essential items. There is significant evidence that the lack of roads is one of the biggest problems in Kenya because it slows education, agriculture and further development into a modern nation (Borlaug). Further, according to Professor Pedro Sanchez, "sub-Saharan Africa is the only region in the world where per capita food production has remained stagnant over the past 40 years" ("Low-tech Methods Improve Crop Yields"). This indicates that the problem is not going to go away on its own. Over the past year alone, problems have greatly worsened in Kenya. Because of poor rains received this year, food prices are escalating and malnutrition is rising, as are conflicts between groups over resources. Child malnutrition rates have greatly risen. In Samburu, a district in central Kenya, the child malnutrition percentages increased from 21.8% to 29.4% in only one month (United Nations). The problem in Kenya is quickly worsening without the technology and research to improve it. There is large debate over which form of research is most beneficial to Kenya; so new research to overcome these challenges is being done in a variety of ways.

Research could have a large affect on agricultural productivity and food availability, therefore improving the situation of typical subsistence farms throughout Kenya. Ground-setting research is being done worldwide to improve farming practices for subsistence farmers in an attempt to increase the food security in the region. Many of these research techniques and products are already in use in other countries and are ready for implementation in Kenya. Although some organizations in Kenya are joining with organizations outside of Kenya to carry out research, most of the research is being done by organizations outside of Kenya and then being implemented when complete. Kenya simply does not have enough technology, resources, or time to carry out research alone. The current status in Kenya is to demanding to allow time for extensive research. Current research that is being done includes research in improving soil quality and improving crop productivity, nutritional content and resistance to drought using biotechnology.

Researchers at University of California: Berkeley are investigating how to implement “low-tech methods to improve crop yields.” They are suggesting mixing decaying plants and crushed rocks into the soil to help improve soil quality, therefore improving crop yield. This is beneficial because most farmers in Kenya could not afford expensive irrigation and fertilizer, even if it was available (“Low-tech Methods Improve Crop Yields”). Because of the limited amount of money available to each family, it is very difficult to have enough money to buy food, let alone expensive equipment. If some low-tech methods can be implemented in Kenya to help with the issue of food security, even if the effect is minimal, it should be done until technology has a greater availability.

Research for improving crop yields and productivity has greatly increased in the past couple of years. There are many different approaches to improving yields, ranging from gene manipulation to environment alteration to biotechnology. Genetically modified crops have the potential to greatly improve conditions in Africa. Researchers say that it is possible for these crops to improve crop yields, disease and drought resistance, medicinal and nutritional value, and much more. One crop in particular that could greatly improve the situation in Kenya is GM rice. This rice is called “Golden Rice,” and is enriched with vitamin A. It can help decrease blindness in young children, which is currently affecting three million children in sub-Saharan Africa due to Vitamin A deficiency. It also has the ability to decrease the chance of death in pregnancy for mothers and reduce the transmission of HIV between mothers to their children. It would not be enough, however, to just implement this “golden rice,” for there are limitations to the amount of good Vitamin A can do if malnutrition is still abundant (“Opportunities and risks of genetically modified crops in Africa”). If Golden Rice can be implemented throughout Kenya, it can greatly impact food security. The rice can make food more available to all citizens of Kenya and decrease the vitamin A deficiency, therefore improving the future citizens of Kenya. It can also help decrease the spread of HIV throughout Kenya and decrease the number of motherless children in Kenya.

In addition to the ability to make foods healthier, genetic research can also create more hardy crops. In Kenya in particular, the Kenyan Agricultural Research Institute (KARI) and Monsanto are researching a disease resistant sweet potato. Sweet potatoes are an important crop in Africa, especially for women. They grow well in east Africa in particular and have the capacity to decrease the rampant malnutrition in Kenya (deGrassi). This is still in the processing stages and all of the small issues with the crop are being worked out. GM crops can also be helpful in increasing weed-resistance. A specific GM maize crop is being perfected so it is able to resist the effects of Roundup. This way, farmers can spray Roundup and only kill the weeds, not the crops (Borlaug). These crops could greatly help with the issue of food insecurity in Kenya by increasing the amount of food available and decreasing the amount of work needed to grow these crops.

Corn is one of the main subsistence crops grown in Kenya. Centro Internacional de Mejoramiento de Maíz y Trigo (CIMMYT), Kenya Agricultural Research Institute (KARI), and the Syngenta Foundation are working to develop corn that is resistant to the stem borer (deGrassi). Lepidopteran stem

borers reek havoc on corn in Kenya each year. Currently, the ways available to control the stem borers are not practical for small subsistence farmers. Therefore, the stem borers are relatively uncontrolled at this time. When questioned, most farmers said that the stem borers were the reason for the death of a lot of their crops, but did not know effective ways to decrease the numbers on their farms (Bonhof). Increasing awareness in farmers and introducing more practical solutions to the stem borer for subsistence farmers can greatly improve the yield of corn, therefore increasing the amount of available food for subsistence farmers.

Many African countries are balking at introducing GM crops, when it could be the answer to their problems. Researchers have been trying to figure out why these countries don't want GM crops. A possible reason may be that the governments don't know enough about the crops because there is often scarce or one-sided information about it. The potential problems are not fully discovered as of yet, but the potential benefits seem to overwhelm any potential issues. One major reason that Kenya is unsure about GM crops is that Europe put a ban on biotechnology. This causes Kenya's leaders to question the risks and benefits of GM crops if Europe does not want to use those crops themselves (Borlaug). Europe has a completely different situation than Africa does, so they do not have a great need for genetically modified crops. Because of their low need of these crops, they are not willing to investigate more about them or do more research with them. In Africa, something different needs to be done. GM crops may be the only option that will significantly change the situation in Kenya, so the possible benefits greatly overwhelm the potential risks.

There are many things that can be done by communities, governments, and worldwide organizations to implement these ideas. Educating farmers about what they can do to increase their crop yield and better their lives is essential if the problem is ever going to be solved. Increased research for improving crop yield and disease and drought resistance will improve the lives of all Kenyans if it can be implemented in a practical way. If the soil can be revitalized to improve crop yield and the burning of homes and fields can be stopped, the environment will be preserved and be able to sustain the people of Kenya for a long time. If the crop yield can be increased, there will be more food for everyone, increasing the amount of income families have, increasing their own food supply, and reduce the fighting between people over resources. Increased agricultural productivity will in turn improve the conditions under which farmers in Kenya live. This will make a better life for everyone in Kenya.

It is necessary to further discuss with the Kenyan governments all of the positive things GM crops have to offer, and then help the governments to implement these crops into their society. GM crops are the best option to improve the situation in Kenya. The options and opportunities for GM crops are limitless. Simply implementing those crops is not enough, however. The infrastructure of Kenya needs to improve, more roads need to be built, education needs to be improved, and the fights must stop. Although there is a very large task at hand, it is possible to solve the problem eventually. Global organizations can help by educating Kenyans about how they should use the new technology and helping raise money to make this new technology available. It is essential to help the Kenyans make their country food secure, so they can continue to improve their lives without help. That is the only way Kenya can be completely food secure and independent.

In conclusion, the Kenyan Government is not doing enough to help its people, despite its attempts. In 2002, the Kenya Special Program for Food Security (KSPFS) was developed. The main goal of this plan was to decrease food insecurity and poverty in Kenya. The government and other organizations encouraged farmers and small ranchers to increase agricultural productivity and income. During the next year, the Kenyan Government started the Economic Recovery Strategy for Wealth Creation and Employment. The goal of this plan was to decrease poverty and economic problems (Kinyua). As promising as these programs may have seemed, they were not enough. In 2004, five of the eight provinces were experiencing extreme famine. Finally, in late 2004, the government "declared the

famine a national disaster” (Mulama). This caused companies and other organizations to donate food and other resources to help out the Kenyan people. The government needed to act sooner and come up with solutions to the problem, not just things that will pacify it for a while. Worldwide organizations such as the United Nations or humanitarian groups need to work with the Kenyan government to help them develop solutions that can decrease the problem overtime, not simply keep it at a standstill for a minimal time (Mulama). The situation in Kenya will not be solved overnight. It will take a lot of work to get their technology and capabilities up to a point where they can produce enough of their own food to survive. New technology and crops will need to be implemented at a very low cost to the farmers themselves so they can begin to become more self-sufficient. In order to achieve this, it will be necessary to communicate more with the Kenyan government and make sure they understand the technology that should be implemented and the potential benefits that technology holds. Worldwide organizations and other countries need to be clearer with the Kenyan government on what needs to be done and what should be their priority. They need to better understand how important being self-sufficient and having a strong economy and agricultural system is. The high malnutrition percentage, the fighting over resources and the death from lack of food needs to stop. It is unfair that some people have so much and others have so little. It is not enough to give food and other items to the people of Kenya. In order to make Kenya food secure, we have to get their technology up to a point where they can produce the majority by themselves. It will be very difficult to overcome the environmental challenges in Kenya to create a country where people do not live in hunger or fear of starvation, but it is possible with the right technology and education of Kenyans. There is a long road to the complete eradication of this problem, but it can be achieved.

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