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Need for Agricultural Research and Improvement in Kenya

The world's population is continuing to grow at an alarming rate. At the current rate, it is estimated that by the year 2054 there will be 12 billion people on the planet. With this exponential growth, comes the challenge of feeding each and every one of these individuals. In the next forty years, the world and its farmers will need to produce more food than has been grown in the last ten thousand years. This is a challenge that is beginning to show its necessity and effects through the insecurity all across the globe. Everyday, more and more of the population is living in poverty and facing starvation.

Currently, Africa is one of the leading areas that is being affected by this crisis. Many of its countries are facing the issue of food insecurity, and they are having to watch its people suffer and perish. Kenya accounts for over 39 million of the world's population, and half of these people are living below the poverty line. Of the population, agriculture accounts for 75 percent of the labor force, the majority in poverty. They, along with many, are facing the problem of starvation among their families and tribes. The subsistence farmers struggle every year to fulfill this necessity. These farmers are making as little as \$271 per year.

Many factors contribute to these declining figures. The insufficient production from Kenya's major crops of maize, millet, and sweet potatoes is a key issue that needs to be addressed. Many are wilting and dying before maturity, while others are producing highly inadequate yields. Consequently, millions are facing the fear of starvation and death. It is clear that there is a need to conduct research into crop biology and agronomic technologies for improving yields, disease and drought resistance, and sustainable agricultural systems. In order to do this, one must first understand and discover how this factor affects and is affected by the agriculture productivity, food availability, and the lives of the Kenyan farmers. One may then look at the possible solutions and suggestions for resolving this crisis. Many groups and organizations continue to confront this situation. However, there are many steps that need to be taken to solve this growing crisis. The hard fact to face is that there is no easy solution.

Agriculture plays a major factor in Kenyan lifestyle and economy. Three-fourths of the labor force is employed in agriculture. There are many crops produced by the farmers of the country. Of the total 569,140 square kilometers of land, only 8.98%, 51,109 square kilometers, is even suitable to grow crops. Only 1,030 square kilometers of land has the luxury of irrigation. With this difficulty, the land must be used to its fullest potential and greatest extent. This leads to great stress not only on the soil, but also the farmers who are trying to utilize it to support their families.

The diet of these average, subsistence farmers is very simple and straightforward. It is referred to by many as a rain fed diet since much of it depends on the production from crops. The number of meals per day varies greatly depending on the availability of the produce. Some go days without a meal, while others are able to eat three small meals a day. Breakfast may consist of morning tea with milk and sometimes sugar. Many serve a boiled maize and bean mixture as a cheap staple meal. Vegetables such as the cowpea, pumpkin, and bean leaves are common during the rainy season. All of these would be served with a corn meal called *ugali*. The young children and infants eat a porridge made of ground maize, which is considered a meal in itself. These are all common for the average subsistence. The daily diet for a wealthier citizen would have many

more ingredients and variety.

Of the major crops, corn plays the most significant role in Kenyan society. Corn, referred to as maize in Kenya, is one of the most important crops not only in the people's diet but also to the entire economy. The lower income population spends 28% of their income on this product each year. The price of corn has risen dramatically in the past few years. This has caused many to spend even more of their income on this product, thus slowing down the economic growth. The average person in Kenya makes \$1,600 a year. Many factors contribute to the increase of the rise in not only corn prices but also food prices. One of these main culprits is the steady increase in gas prices. Over the past ten years, oil and gas prices have quadrupled all around the world. Even in the lower class society, where gas is rarely used, it can have crucial side effects.

The rise in food prices is not the only factor that affects Kenya. The lack of availability of fertilizers, insecticides and herbicides have limited the yield and production of the agriculture in this country. This makes it even harder for the people and their government to meet their needs. The farmers lack in production causes a struggle for them each and every day. When they are unable to meet their own needs, they cannot supply the market with produce to sell to the rest of the population.

Since the 1970's, maize production has been down over 44 percent--not even coming close to producing the minimal amount needed. Kenya's population will consume as much as 2.9 million tons of corn in less than one year. With the current crop, the government will have to import over 400,000 tons this year to cover the shortfall. With this help, the average population is still falling short of the recommended calorie consumption each day. The food available for Kenyans has decreased to less than 1,965 calories per capita per day, which is far below the recommended 2,250 calories per day. This is causing starvation and food insecurity to become major issues in everyday life.

In developing countries, such as Kenya, this insecurity can be a great concern to its growth especially without a growing economy to support the government's efforts. In the past few years, Kenya's economic growth has been decreased to between one and two percent. Its population is unable to stimulate or even support the weakening market. They alone are trying to live day by day with what they have. However, this lack of growth and prosperity is not solely due to lack of citizen support. The government of Kenya is very unstable and insecure itself. The corruption in this nation is extremely high, near 85 percent. This can cause many international organizations to avoid providing help and support to this country when they know it will not reach the people.

The resources that are available to improve the crops of the area are very expensive. The government has made efforts to try to aid the subsistence farmers. It has bought seed and fertilizer and provided it to the farmers at a reduced price. It has also begun to improve the infrastructure of the country in the rural areas, which is a major cause for the lack of growth in the agricultural systems and technology. Much of the population is divided or separated from one another due to this issue. All of these are only very small steps that the government has been taking in order to solve this significant issue.

With the recent drought that has swept across the country, the struggle to gain government support and help has intensified. The agricultural system in Kenya is highly dependent on the seasonal rains each year. In Kenya there are two wet seasons. One of these seasons occurs from March to June and the other runs from October to December. These are very short periods of rain of which the farmers must take advantage. Other than this natural rain

water, there is almost no other water supply available to the people. Of all the land, there is only a little over 1,000 square kilometers that is irrigated. The rain can be a blessing, yet it can also become a nightmare. One problem that comes with these rains is frequent flooding. This shows that a farmer must make use of the water and time that one has to grow the food needed.

Another, if not the largest issue affecting this intensifying crisis, is tradition. In Kenyan society, the distribution of the work load is very unfair and unjust. Men, like most societies, are considered the head of the household. They make all the decisions for the family, including those during the planting and harvesting seasons. Despite their role, the work load that is involved with these crucial decisions is left up to the women and children. Men prepare the land for the planting, and after this point they turn it over to the women. The women now have the responsibility of planting, tending, and harvesting the crops. With this, they are also expected to cook meals and look after the children. The children are also expected to labor in the fields when needed. They are often taken out of school in order to work and look after the farm. Some children that lose one or both of their parents are expected to take on these duties and will receive little to no education. These responsibilities are a major cause for the lack of education all across Kenya.

The education of any country's population directly affects and leads to its success. Kenya is lacking in this aspect. The farmers are not interested in giving an education to their children. They would rather have them home. As more and more children begin to help their families on the farm, fewer and fewer are gaining the essential knowledge they need. A major portion of the rural children attend some levels of primary school (equivalent to 1st-8th grade in the United States), yet many drop out before completing the full term. It gives them enough education to add and subtract but not necessarily to be able to read and write. On the other hand, there are a few that pursue a higher education at the next level. For the most part, these students do not tend to stay on the farm. They follow a different path towards, what they believe to be, a better life. As a result, any new ideas or concepts that they may have learned will not reach or be applied on their family's farm.

If these new methods do reach one's family farm, it may never spread past that farm or tribe. Greed is a problem among Kenyan farmers that must be solved. There are up to 70 different tribes in Kenya, each one owning their own area of land. They try any way possible to satisfy the needs of their people. This is one of the main reasons for the greed between the tribes. When a new idea is introduced, the tribe will try to keep it to themselves. The idea will help their group prosper and succeed. This may help one group, but it can also harm another. Many organizations count on the people themselves to spread many of the concepts that they help to introduce. For the most part, the ideas never expand or reach outside of the tribe. This is a large problem in allowing the outside support to take a countrywide effect.

Greed and tradition are two obstacles that the Kenyans must overcome before possible solutions could even have a chance. There are many answers in the air that could help the people, especially the subsistence farmers. Many of these techniques have been available and implemented in other countries, such as the United States for almost one hundred years. Techniques that may seem simple but that could help the farmers in indescribable ways. These new ways would allow Kenya as a country to be self-sufficient and even have some goods to export.

Kenyans have very small amounts of land that are suitable for farming. The farmers speak of their holdings in *points*. Each point represents 1/100 of an acre. A two acre farm is considered to be quite large, while the average farm is generally made up of five points. Some

are beginning to cut down trees in order to have larger plots for their crops. This may even be a partial cause for the drought. Cutting down these forests disrupt the natural water cycle. It causes less water to move through the system; consequently, it leads to less water in the atmosphere to fall to the ground.

In the United States, as well as many other countries, there are companies working to improve the yield of crops. Some of these companies include Pioneer, Monsanto, and Syngenta. They want to make the best use of the land and other resources that go into the production of these goods. Monsanto has a goal to help the world “produce more while conserving more.” These are both significant problems in Kenya that are facing its farmers.

There are many basic processes that Kenyan farmers could consider. One of these processes would be crop rotation. This is the process of planting different crops on one plot of land. This allows certain plants to put different nutrients back into the soil. Crop rotation helps to preserve the nutrients in the soil while reducing the need for fertilizers. These nutrients are necessary for other crops to prosper. Many American farmers have been doing this for decades using corn and alfalfa. This is a natural way that the farmers could improve their crop yields without having to damage the topsoil. Currently, the soil that the subsistence farmers of Kenya use has had the same crop planted on it for hundreds of years. It is continually depleting the quality and amounts of nutrients available in the soil. This alone can consequently decrease the yield that the crops produce.

Seed genetics is another matter in the current yield situation. The Kenyan farmer’s seed genetics date back to the beginning of farming. Today, they are still using the seeds that their ancestors used thousands of years ago. These are all open pollinated seeds, which are seeds that are grown and pollinated naturally. These are selected for desirable traits that the parent plant may have shown. Although they may have attractive traits, their yields may not be so appealing. The average yield with these genetics is only 25 bushels per acre. This method was used in the United States up until the early 1930’s. American farmers then began to use double and single cross hybrids. The yields on the crops, such as corn, began to double and triple. Currently, producers are using and improving biotech seed.

Biotech seeds have had one or more genes, biotechnology traits, implemented in them. These genes are based highly on corn production. In 2006, the Kenyan government passed a law allowing the use of these products in the country. It is clearly a demanding issue for corn in Kenya; however, it is applied to many other crops including soybeans and wheat. These traits include yield guard corn, Roundup ready corn, and root worm protection. Each one helps to increase the production of the corn plant by protecting it from different plants and insects. The yield guard trait kills corn borer. This is an insect that attacks and eats away at the plant and its seeds. Roundup ready corn immunizes the plant to the herbicide, Roundup. This allows the farmer to spray this chemical on the crop and kill weeds without harming the plant. The final trait, root worm protection, protects all of the root base. It can help to increase the yield by as much as 40 bushels per acre.

Plant population and spacing would also be a very simple concept that could help Kenyan farming substantially. It is to the farmer’s advantage to use the highest percentage of the sun’s energy and rainwater that falls. The sunlight and rain that hits the ground is wasted and does no good for the plants. A farmer needs to try and reduce this waste and put it towards increasing the production of the plant. Drought is a natural disaster that can devastate countries like Kenya. It has had its affects on the United States as well. Companies in the U.S., like Monsanto, are beginning to experiment with drought resistant seeds. Some of the results show the plants using

substantially lower amounts of water while still maintaining the yield expectations.

Many groups on all levels are trying to help the people of Kenya. National groups, such as Kenya Red Cross Society (KRCs), District Steering Groups (DSGs), and the Kenya Food Security Group (KFSSG), are trying their best to respond to the crisis in their country. They must keep up these efforts to solve the problem. However, the problem is much too big for them to handle on their own. The Government of Kenya must begin to take a larger role in this fight. They must begin to solve their problems with corruption and greed in their system. Doing this will allow more of the necessary funds and supplies to reach its starving people.

Many international organizations are very willing to help with this growing disaster, but first the people must change. The fact is that they must consider and accept some of the new developments and concepts that these groups are trying to introduce. Many are very reluctant to veer away from the practices that the generations before them have used. This is a chain that must be broken. Most of the reluctance is coming from the men that do not perform the hours of labor that are involved in the farming. They need to realize how much it is hurting their families and people as a whole. Some groups have found their way through to the people. Two of these include Water Efficient Maize for Africa (WEMA) and the United States Agency for International Development (USAID). WEMA is funded through the Bill and Melinda Gates Foundation and, along with USAID, plays a major role in the effort. Companies are waiting to intervene and support the effort, but they need the support and willingness of the Kenyan people.

There are many struggles that the Kenyan government and its people are trying to deal with at this time. The high poverty and starvation levels are unquestionably at the top of the list. They must begin to try and solve this problem. Improving their own agriculture system is a key factor. It is clear that the Kenyan government needs to conduct research into crop biology and agronomic technologies for improving yields, disease and drought resistance, and sustainable agricultural systems. The subsistence farmers of Kenya must also want to grasp and use these methods in their own systems.

To further understand the situation, one must look at the facts behind the problem. They must be understood to help solve the problem. By discovering how the research factor affects and is affected by the agriculture productivity, food availability, and the lives of the Kenyan farmers, one can look at the possible solutions and suggestions for resolving the crisis. The research and help must continue. It is vital to the people of Kenya. Getting the ideas and methods across to the people is the major challenge. It must be addressed before it is too late.

The solution to this crisis may involve changing an entire culture. It is not going to be an easy task, but one must take it a small step at a time. Many believe that the real answer is in the young adults of the country. They are very willing to accept these ideas and technologies. Many of the teenagers who have lost both of their parents are becoming more successful farmers than those of their area. This is because they are trying to use these concepts to relieve the stress caused by this new responsibility. With a little extra work, they are able to overcome this obstacle and are even able to gain somewhat of an income. This is where the cycle must be broken. It took the United States over 100 years to get itself from the point where Kenya is to where it is today. With the help of many organizations and international groups, Kenya and its farmers could expedite this growth.

Food insecurity is a major challenge all around the world. With the exponential growth of the world's population, it is something that needs to be addressed and controlled. The weight of this issue cannot be left upon the shoulders of a select few organizations or countries. The

world must face and overcome this challenge. There is clearly no easy answer, but by taking small steps there are possible solutions.

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