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Rwanda, Factors 1 & 13

Rwanda: Genetically Improved Crops and Natural Family Planning to Save a Nation

Rwanda was hardly a blip on the radar of the world until the genocide that took place in the tiny land-locked Central African country in 1994 when extremist members of the Hutu tribe attacked and killed nearly one million members of the rival Tutsi tribe in only one hundred days. In the aftermath of this horrible tragedy, Rwanda's economy was significantly reduced and her people scarred for life, though since then, both have improved considerably, but not enough. The country's economy went from an annual rate of US \$140 per capita GDP (Gross Domestic Product) in 1994 to an estimated US \$1284 in 2011. Though it is a major improvement, it is still not nearly enough to live on. The nation has one of the highest population densities in Africa with approximately ten million people and about one thousand inhabitants per square mile for a country just about the size of Massachusetts. Of that number of people, forty-six percent of them are at high risk of food insecurity, malnutrition, or starvation. The country is ranked 166th out of 187 countries in the United Nation Development Program's (UNDP) Human Development Index of 2011, meaning simply, that Rwanda is one of the poorest and least developed countries in the world. The major issues faced today in Rwanda would be related to the foremost obstacles such as deforestation and malnutrition, for which the main cause is the rapidly increasing population. Despite the fact that Rwanda's chief industry is subsistence agriculture, the amount of crops grown cannot hope to keep up with the rapidly growing population, forcing the importation of items as basic as food. Rwanda is in desperate need for the bare necessities of life: food, water, and living space. The simplest way to combat this problem would be to increase crop yields in order to accommodate such a large population by planting genetically improved plant varieties and implementing programs such as Natural Family Planning (NFP). ("Rural Poverty in Rwanda.")

The people of Rwanda officially recognize one nationality which is 'Rwandan,' though the country is historically comprised of three main ethnic groups: the Hutu, which account for nearly eighty-four percent of the population, the Tutsi, which make up approximately fifteen percent of the population, and the Twa, a pigmy race that is only about one percent of the Rwandan population. It is said historically that the Twa were the first people to inhabit the land which is now Rwanda. The Hutu came next and brought new farming techniques. Finally, the Tutsi came bringing the domesticated animals, particularly cattle. Because the Tutsi were the only ones who had the domesticated animals, they employed the Hutu and Twa to work for them, believing they were superior. The Tutsi implemented an almost feudalistic government over the Hutu, which instigated long-lasting rivalries. The tensions continued for centuries, eventually culminating in the 1994 genocide when the Hutu seized the government, killing nearly one million Tutsi. Today, the ethnic groups are more united than they have been for a long time. Rwanda now faces not ethnic issues, but issues related to food security and overpopulation of the tiny county. ("Rwanda: Overview.")

Rwandan families are typically large, possibly due to the fact that the two more popular religions in the country are Roman Catholicism and Islam. The average birth rate for a Rwandan family is approximately 5.37 children, compared to the 1.7 children per household in the United States. Agriculture provides over eighty percent of Rwandans with jobs. Despite this reliance on farming, about sixty-five percent of the rural population lives below the poverty line, struggling daily to provide a meal for the family. An alarming statistic states that one in five children will die before they reach the age of five, either from malnutrition or from diseases such as malaria. Rwandans have limited access to health care, with the largest hospitals in the bigger cities that are unable to account for the country's extensive rural population. The availability of doctors is also extremely low, with only about two educated and registered doctors per

one hundred thousand people. Often times, the people of Rwanda rely on the indigenous healers of their own village that use considerably more primitive means of healing because of the lack of educated doctors. The Rwandan people can get government provided education for the first nine years of school, though many of the people in poverty cannot afford to send their children to school because of the cost of uniforms and books, or the need for the children to help on the family farm. There are a number of colleges in the country (most being in the larger cities), although only about five percent of the people of Rwanda who attend primary school can be expected to attend a college. Though the literacy rate in Rwanda is around seventy-one percent, Rwandans are in need of better education in order to secure the safety and well-being of future generations, improve the healthcare of the average person, and eventually solve the problem of national hunger. ("Rural Poverty in Rwanda.")

Rwanda's major source of industry is subsistence agriculture where the people raise coffee, tea, bananas, and potatoes. Coffee and tea are often raised on larger farms and are among Rwanda's major exports. Subsistence agriculture is defined as a farming technique by which the farmer only grows enough food for his family without anything left over to be sold at a market. The average Rwandan diet consists mainly of sweet potatoes and beans, adding bananas, corn, and fruit when the seasons are right. Because of the desperate need for fields to grow crops, much of the Rwandan soil has been overworked, causing soil erosion. To combat this problem, the people of Rwanda have begun the destructive process of deforestation in order to acquire more fertile farm land at the cost of destroying the natural habitats of thousands of animals. On top of that, the reliance on the income from the coffee and tea exports makes Rwanda's prices at home subject to constant flux. Rwandans also raise rabbits, cows, sheep, goats, and chickens, depending on the geographical location of the farmer. However, despite the reliance on the industry of subsistence agriculture in Rwanda, the crop yield is unable to keep up with Rwanda's rapidly growing population. ("Rural Poverty in Rwanda", "Rwanda")

Rwanda's natural terrain makes it difficult to farm, with a wide range of very different terrains leaving only a limited space for farmers to make a living. This contributes in part to the food insecurity of the country, along with the tremendously dense population. Rwanda is sometimes referred to as the Land of a Thousand Hills, due to the mountains in the west. Rwanda consists mostly of grassy uplands and hills as well as a savanna like area in the eastern part of the county. The country also has a diverse jungle home to the Mountain Gorilla, which is an endangered species. To avoid more problems related to the deforestation of Rwanda's rich jungles which are often cut down for farmland, a different solution, such as genetically enhanced plants, would be an ideal choice, as it saves both the jungles and the Rwandan people. ("Rwanda")

Scientists across the globe began experimenting on genetically engineering plant genes in the early 1990's. They discovered that if one were to introduce a specific gene into the DNA of a plant, the plant would then go through a process of adopting the introduced trait. These genetically engineered plants that now cover the market have the ability to resist certain diseases and pests, survive in different environments, and produce a higher yield of produce, all depending on the specific introduced gene. The introduced gene itself does not necessarily need to be a plant gene, but instead, it only has to be a gene that carries the specific trait that one would want the plant to acquire. This makes genetic engineering quite similar to traditional plant breeding techniques that have been used for centuries: eliminate the bad genes in order to secure the continuation—or in this case, the enhancement—of the good plants. Because of this, global food production has increased exponentially since the time that these genetically engineered plants reached the market. ("What Is Agricultural Biotechnology?")

One statistic shows that in 2003, approximately eighty-five percent of the seven million farmers worldwide using genetically engineered plants were from underdeveloped countries. This makes sense because it is in these underdeveloped countries where the greatest need for food exists. Genetically engineered plants can be modified to increase the crop yield of the single plant, meaning a higher total

production of food. Implementing genetically engineered crops in a country facing starvation, such as Rwanda, could solve the problem of national hunger as well as help boost the decimated economy. The problem, then, would be related to the acquisition of these genetically engineered plants which are common for Americans and Europeans, but completely foreign to the native people of Rwandan. One source stated that the countries in Africa—Rwanda included—should not merely focus on acquiring these genetically modified plants from other countries, but rather focus on re-inventing the process in their own countries. This would be much simpler because in other countries, much of the research on these genetically altered plants is protected by patents and other such privacy laws that are difficult to navigate. Thus, re-inventing the process of genetic engineering in Rwanda seems to be the most logical option in order to increase crop yield to feed thousands of starving people. ("What Is Agricultural Biotechnology?")

The process of re-inventing genetically engineered plants and implementing them into the economy is not something that can exactly be completed overnight. The process could begin, though, by simply making education for the youth more accessible to the common person in Rwanda, which is fortunately a major part of the plan by the Rwandan government to improve the livelihood of their people by 2020. Rwanda would have to go about doing this by opening more schools. Despite the cost of doing so, the act of founding these new schools would eventually be of benefit to the economy because the schools would hire teachers, who, in turn, would be putting a large portion of their income back into the economy for basic items such as food, clothes, and other commodities. It would give adults more jobs and would give the children an opportunity to better themselves, those around them, and eventually their whole country in the future. The process of solving national hunger through genetic engineering of crops is certainly not a particularly simple undertaking, but with the effort of the people and the support of the government, it is, in fact, a possible task. ("What Is Agricultural Biotechnology?")

In the large number of smaller communities in Rwanda, it would be important to educate the adults on the importance of sending their children to school, even if they, themselves, never sat in a classroom or attended school. This is a vital step in solving the problem because, often times, the adults won't send their children to school due to the cost of books and uniforms or the need for the children to help at home on the farm. The government and communities need to be able to provide support to these families who view school as a disadvantage, perhaps by financial services. The necessity of a real education among Rwandans is vital for the future generations of their people to understand the need to improve farming techniques to feed the nation. The government, communities, as well as every individual must see the importance of an education in order to implement a solution such as genetically modified crops for the continuation of the Rwandan people. ("What Is Agricultural Biotechnology?", "Rwanda", "Economic Development & Poverty Reduction Strategy 2008-2012.")

If Rwanda were eventually to put these genetically altered plants into the fields of their farmers, so to speak, the results would certainly be beneficial. First of all, there would be a considerable number of new jobs opening up for the people. There would be positions for scientists to continue making advancements in genetic engineering of plants, teachers to educate the youth on the importance of these plants, manufacturing industries to process the plants and, of course, the farmers who plow the fields and harvest the fruits of the country's labor. All of these jobs would be feeding the economy and the people of Rwanda, making it possible for money to circulate and people to rise out of the confines of poverty. Secondly, the higher yield of the genetically engineered crops would hopefully be enough to significantly reduce, if not eliminate the ongoing issue of food insecurity that Rwanda presently faces. ("What Is Agricultural Biotechnology?")

Although the government of Rwanda has not specifically implemented the use of any genetically engineered plants, it has made some rather significant steps forward to improve the livelihood of the everyday Rwandan. For example, in December of 2011 the United States Agency for International Development (USAID) began setting up programs in Rwanda to improve the people's lives. Locally, the

program is known as *Ejo Heza*, which means “Brighter Future” in the native language of the Rwandans called Kinyarwanda. The program itself is a five year plan, from 2011 to 2016, to improve the lives of seventy-five thousand of the poorest Rwandans, particularly those of the women in the country. USAID plans on focusing in on increasing the people’s demand for financial services through education on their importance and then begin the process of implementing these financial programs into the lives of these Rwandans. On top of that, USAID plans on implementing short-term as well as long-term programs to educate the population on the importance hygiene and nutrition, in the hopes that it will lead to greater food security in the future. (“Economic Development & Poverty Reduction Strategy 2008-2012.”)

Another way of improving the lives of the people of Rwanda is to help them implement programs such as Natural Family Planning in order to help control the rapidly growing population in a humane way. Natural Family Planning is an educational program that teaches married couples natural ways of achieving and/or limiting pregnancy. It is a morally acceptable way to assist the Rwandans to reduce the population in the future and it is easy on the average person, unlike contrary methods such as relocation or deportation to decrease the population of a country. On the United States Conference of Catholic Bishop’s website, it states, “NFP reflects the dignity of the human person within the context of marriage and family life, promotes openness to life, and recognizes the value of the child.” This is particularly important especially to the people of Rwandan after the genocide in 1994 and all the atrocities people saw of the destruction of life. It is vital for these people to support life because in their scarred history, they have seen so much death. Natural Family Planning is a way to support the dignity of the human person as well as help the Rwandans with their rapidly increasing population. This program certainly wouldn’t reduce the population immediately, but in the future generations, if the program is implemented, the population could be significantly reduced. Natural Family Planning is also consistent with the beliefs of the Roman Catholic Church, to which a majority of the Rwandan population belong. It would be a program that goes along with the personal beliefs of the average person in Rwanda as well as help the Rwandan people as a whole eventually reduce the population. Along with the implementing of the genetically engineered crops, Natural Family Planning could help secure the availability of food in the future generations for the people of Rwanda. (“What Is Natural Family Planning?”)

In the decades to come, if the problem should be solved by these genetically engineered crops and programs such as Natural Family Planning, Rwanda could, for the first time, begin to modernize itself as a country. The genetically engineered plants, in theory, would be more resistant to sudden climate change, insects, and diseases, therefore perhaps allowing fewer people to rely solely on agriculture for their means of making a living. The genetically modified plants could also help Rwandan farmers to plant in the more inhospitable regions of the country, such as the savanna, and avoid the destructive problem of deforestation. Natural Family Planning would be a way for the population of Rwanda to be naturally reduced and the people to begin to live more comfortably with the security of food. The process of urbanization would thus begin, and as in the Industrial Revolutions in Europe and the Americas centuries ago, Rwanda would begin to make advancements as a nation and place itself on the radar of the world in a better, more sophisticated way this time. (“Rwanda”, “What Is Natural Family Planning?”)

Though the problem of national hunger in Rwanda cannot be solved instantaneously, it is possible for the people of this country to become a self-sustaining nation through the use of these genetically modified plants and educational programs such as Natural Family Planning. Through the education of the youth in order to see the use of these plants in the future, Rwanda has, for the first time in a long time, a hope of becoming a strong nation that is able to support its own people. With the natural reduction of the population through educational programs such as Natural Family Planning, the people of Rwanda would have food, the country’s economy would be sufficient for the large number of people, and Rwanda as a nation would be finally whole again. The major problems faced by the people of Rwanda today, such as deforestation, overpopulation, and national hunger can all be solved through the use of genetically engineered plants and programs similar to Natural Family Planning. Deforestation for farm land would

cease to occur if the already tilled soil were to produce a higher yield of crops through the use of the genetically engineered plants. This in turn would also significantly increase the availability of food and food security for the people of this country. Finally, through means such as Natural Family Planning, the future generations would have a lower population as well as have access to a greater amount of food due to the fact that the lesser number of people there are, the smaller amount of food is needed to feed them. Thus, it is possible for the people of Rwanda to make for themselves a better life than the generation before them. ("Rwanda", "What Is Natural Family Planning?")

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