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### **Zambia: Malnutrition's Effect on Zambia's Future**

Zambia is located in the southeast part of Africa and is surrounded on all sides by other African countries. Zambia covers an area of 290,600 sq. miles and its population is roughly 13.5 million people. Its natural resources are copper, cobalt, lead, zinc, gold, silver, emeralds, coal, and uranium. Zambia exports these natural resources all over the world. Zambia imports a few things such as some machinery and equipment for their mines, non-crude oil, trucks, aircrafts, cell phones, and other electronic devices (*Bridgat*). Zambia was once a growing, middle-income country with a bright future and many opportunities. But due to poor infrastructure and 30 years of economic decline, it has become an increasingly poor country, which, has in turn, brought about the dangerous issue of malnutrition (*Rural Poverty Portal*). Most of the malnourished people in Zambia live in the rural areas but are scattered throughout all income classes of people (*World Bank*).

An average rural family in Zambia consists of 7 children and sometimes 2 parents. In Zambia, however, it is rare to live over the age of 40, so many families in Zambia are single-parent households or households in which both parents have died and the family is run by an older sibling or close relative. Their diet consists of nshima (which is a type of cornmeal and a staple of Zambia) and vegetables. Sometimes, depending on whether the family can afford meat, they will eat meat with their vegetables. If the family can afford the educational fees, children can attend school from 1<sup>st</sup> to 9<sup>th</sup> grade. Unfortunately many families' children are never able to attend a school or if they do, they will only attend for a few years of their life. Zambia has year-round school terms with April, August, and December being vacation months. If a student makes it to 9<sup>th</sup> grade, he/she is required to take an exam to decide whether he/she will continue with his/her education to 10<sup>th</sup> grade and on or not (Banda). But even if the student does pass his or her 9<sup>th</sup> grade exam, if his/her parents cannot pay the educational fees to continue with school, the child's education will end there. The average length of education for children in Zambia is 7 years (*Central Intelligence Agency*). Zambia has, however, made some progress in the areas of school accessibility and gender segregation in the recent years. But still, more than a quarter million children are not in school (*UNICEF*). Health care in Zambia is also lacking. A few towns such as Lusaka, Kitwe, and Livingston, offer better health care than other towns but again, it is for only those who can afford it (Banda). Zambia has a population of over 12 million people, which requires around 2,300 doctors and 16,732 nurses. Sadly, there are only around 646 doctors (1/4 of how many are needed) and 6,096 nurses (a little more than 1/4 of how many are needed) in Zambia. In the villages where there is a clinic, one will find a nurse and on occasion, a doctor will also be available, but these clinics are often shared between several towns and are very overrun with patients. In Zambia, the patients are often sent home with painkillers such as Tylenol instead of the medication he/she needs. Also with only a small clinic for several towns, people don't receive medical attention as quickly as they should, and they might have to wait in a line for hours, no matter the ailment.

An average rural farmer in Zambia owns 2-3 hectares of land to farm. Everything on the farm is done by hand with gardening tools and/or by the help of cattle. Most rural farmers cannot afford tractors or other machines. However, commercial farmers often have tractors and other farming machinery. Farmers plant their crops during the rainy season, which usually starts in November and ends sometime in February or March. The average Zambia farmer will normally grow maize (corn), tobacco, and cotton. Some will grow vegetables such as tomatoes, onions, cabbage, and carrots. Most farms also have some livestock such as chickens, goats, sheep, pigs, and sometimes cattle. Once they harvest their crops, they will dry

some of their maize, grind some to make mealie meal (which is usually used to make a type of porridge), and some will be used to feed livestock. The family will sell any extra maize and use the money to purchase more seed and fertilizer to use for the upcoming planting season. The food and necessities that are not grown or produced on a family farm can be found at local food markets or grocery stores.

One of the barriers of rural farming is the lack of finances to purchase good seed to plant and fertilizer to replenish the nutrients in the soil. Other barriers of farming in Zambia are also related to the weather, to the soil types in certain regions of Zambia, and other natural factors. For example in North Zambia, soil tends to be more acidic whereas in Southern Zambia, the soil is not as acidic but the overall climate is drier (*Rural Poverty Portal*). Droughts lasting for a few weeks or for a few months may develop. There may be extreme flooding which may wipe out all of the crops and drown cattle (*Water Wiki*). There are no barriers to food markets in Zambia. Food stands are scattered all over a town. There are also grocery stores in towns where food and other necessities can be purchased. The food market and smaller food stands are a more inexpensive option for most farming families or townspeople. There are barriers to adequate nutrition, however, since families might not always be able to purchase the right nutritious food or if they are able to purchase it, they may have not been educated on proper nutritional habits. Sometimes even when a person has learned about the proper nutritional choices, it is hard for him/her to change his/her old habits or the person may still just want to put other purchases ahead of nutritional needs. The major barrier to adequate nutrition is the fact that many Zambians don't know what proper nutrition is.

Zambian malnutrition is an issue that has been around for years. Its rates have not really changed since the early 1990s. Malnutrition is a large problem for the children in the country, especially for those under the age of five. Malnutrition in Zambia unfortunately begins at birth with over 12% of the children being born with low birth weight (*World Bank*). These infants often die because they did not receive the proper nutrients that they needed while they were developing and therefore did not develop correctly. The infants that do survive are at high risk for impaired cognitive development (*Doctors Without Borders*). Cognitive development is the development of thought processes, including memory, problem solving, and decision-making. This impaired cognitive development will follow them throughout their entire life, affecting their ability to find a job and, once found, being able to keep that job (*Health of Children*). Forty-five percent of children under five have had their growth stunted due to malnutrition, fifteen percent are underweight for their age, and five percent have low weight for their height (*World Bank*). Also, many people in Zambia suffer from HIV/AIDS, which contributes to malnutrition rates because people suffering from HIV/AIDS require an even more specific nutritional diet to help build their immune systems (*Essortment*). The natural disasters that Zambia seems to be prone to can turn a family that has a farm and is growing most of their food with good nutrition into a family that is left with nothing and that doesn't know from where their next meal will come. Various factors explain the reason of the overabundance of malnutrition in Zambia. Among them are a lack of good nutritional knowledge, the fact that Zambia seems to be prone to large natural disasters, poor child feeding habits, malnourished pregnant women, and disease.

Malnutrition in Zambia is currently wide spread and a major issue, especially for Zambia's next generation. Though malnutrition affects people of all ages in Zambia, children in Zambia seem to be affected the most by malnutrition (Hatyoka). Though there are many organizations in Zambia trying to assist in the ending of malnutrition, there are still many remote villages that have yet to be reached, so they have not been taught about proper nutrition and providing proper nutrition for their children. Unfortunately even if these Zambian families are reached and shown proper nutrition, 47% of them will still lack food security. Many poor families that do have enough finances to purchase nutrient abundant food will purchase cheap and basic foods such as rice and corn. These foods are full of calories and will keep the family full but lack the nutrients the family needs to maintain a healthy diet.

It is extremely important for the future of Zambia that the problem of malnutrition be halted or at least its rates lowered. In extreme cases of child malnutrition, its victims are no longer able to walk and brain development is affected. Adults suffering from impaired cognitive development damage Zambia's productivity and growth in the work force. Annually Zambia loses \$186 million because of poorly-structured programs trying to end malnutrition, the extra stress that malnutrition places on Zambia's health care system, and the people suffering from malnutrition being not as productive in the workforce (*World Bank*). So not only would ending malnutrition in Zambia help in producing a healthy future for Zambia, but it would also help Zambia's overall economic system.

Natural disasters seem to happen often in Zambia and they play a large part in Zambia's malnutrition issue. In recent years, natural disasters in Zambia such as droughts and flooding have become more widespread. For farmers in Zambia, droughts are a part of their life, but these droughts that are now occurring, unfortunately, last longer and are more frequent. When the rain comes, it comes in too large of amounts, causing flooding that wipes out everything in its path. Crop failure, outbreaks of human and animal diseases, and destruction of property and infrastructure are direct results of the recent floods and droughts. These natural disasters in the past few years have affected 1.2-1.4 million people; they damage everything in their path, often killing entire families at a time, or just parts of families, leaving some children orphans (*Water Wiki*). These disasters leave people and families poor and with nothing to eat. As Zambia's population grows, malnutrition will become more and more obvious, damaging the country further if the issue is not resolved.

Many organizations such as the Global Giving Foundation, UNICEF, and other smaller groups such as schools and churches send food and necessities to Zambian families, but many families have not been educated on how to properly use these items. For example, a church sent a care package to a few families in an African country; one of the items in these care packages was baby formula. The women who had received the baby formula didn't know how to correctly mix it. They believed that as long as it was still white and looked like milk they could mix anything in it in any amount. They would water down the baby formula so much that babies being fed it were not receiving enough nutrients (Banda). Yes, they were receiving food to help keep them alive but they weren't receiving those nutrients and minerals that babies need so that their growth wouldn't be stunted or so they won't encounter further health problems in their life. These organizations are doing their part in sending over nutritious food and other necessities that these families need, but they also need to demonstrate to these families and people how to use the products correctly. These programs should also be offering free services that help educate people and families on proper nutrition for all ages. Also education on proper hygiene and other practices that help prevent diseases is needed. These organizations, along with help from the government, need to focus on reaching remote villages in addition to the larger towns.

Zambia is doing as much as it can as a country but being a poorer country, it can't do a lot. Vitamin A deficiencies cause blindness, increase the risk of dieing while suffering from a type of illness, dry skin, and abnormal bone growth (*Essortment*). Zambia has given out high rates of vitamin A supplements for children 6 months-5 years; these children receive two doses of these supplementations a year (*World Bank*). This has helped reduce the rate of vitamin A deficiencies in small children and pregnant women but still more than 50 percent of preschool-aged children and 14 percent of pregnant women are affected by vitamin A deficiencies. Another issue is iron deficiencies; more than half of preschool-aged children and pregnant woman are anemic. Zambia does provide some iron-enriched supplements for pregnant women and younger children and deworming for younger children, but there are very few programs in Zambia that are focused on ending iron deficiencies and anemia. One of the areas Zambia could grow in would be non-profit programs with goals to lower the number of people affected by iron deficiencies and anemia. The rate of low iodine levels in children has gone down greatly, which is attributed to an

enforcement of the universal salt iodization legislation law, which was passed in 1978 and was reinforced in 1996 (*World Bank*). One program in Africa that is working towards ending malnutrition and producing more basic foods that are higher in vitamins and minerals is called HarvestPlus. Director and founder of HarvestPlus, Howarth Bouis, had the idea of changing the genetics of Africa's basic staple foods such as rice, potatoes, corn, etc. so that their staples were more enriched with the needed nutrients that many families are not able to receive. HarvestPlus takes corn or another type of food and genetically alters it until it has higher nutrients, which makes it healthier and, hopefully, more cost effective to buy. Their most effective project was the orange sweet potato that is grown in Mozambique and Uganda, Africa. The orange sweet potatoes have higher levels of vitamin A in them than normal potatoes. Zambia, however, is not a potato-growing country. Thus, HarvestPlus has begun to distribute a different type of corn with deep orange kernels. This new type of corn has high levels of beta-carotene. Beta-carotene helps the body produce more vitamin A (*Essortment*). The main roadblock with introduction of this new corn type is that people do not like change. It may take a decade for farmers to start growing this new type of corn and realize that it does have more nutrients than their average corn that they have grown for generations. Therefore, demonstration plots and financing the purchase of the seed is needed (Charles).

HarvestPlus hopes to convert Zambia to farming this new type of corn within the next decade (Charles). When this happens, many families will be able to get the vitamin A that they need or at least close to the amount that they will need. Consequently, organizations will not have to supply as much vitamin A supplements as they do now, thereby allowing them to focus on iron deficiencies or other malnutrition-related issues.

So to bring about the end of malnutrition, the people of Zambia need to make changes in several areas. First, Zambia needs to begin advertising and demonstrating HarvestPlus's genetically-engineered corn. Secondly, Zambians need to start growing cowpeas, a drought-resistant crop similar to the maize that is currently grown in Zambia. The droughts that are common in Zambia damage the maize crops, but with cowpea crops, this damage would not occur. So along with the genetically-engineered corn, cowpeas also need to be advertised as another crop farmers should be planting (*World Food Programme*). Thirdly, Zambia needs to even out its vitamin supplementation programs. Most of their programs are centered around Vitamin A deficiencies; very few programs focus on iron or other vitamin deficiencies. Finally, Zambians need free education to show people how to what they are given correctly; money, food, or anything else can be given to people but if they do not know how to use it correctly, chances are they will not use it correctly.

Communities and organizations in Zambia need to focus on education and raising awareness of malnutrition. Because most communities in Zambia are poor, parents and older siblings need to be taught proper nutrition and what they can do even if they do not have much money to spend on food. They need to know how to be taking care of their children or younger siblings properly. Communities, along with the organizations, need to continue to develop programs that help educate people of all ages about proper nutrition for free. Organizations should also help reach rural villages with food supplies and medical attention because diseases also play a role in malnutrition in Zambia. Many of these organizations are trusted by the communities that they work in so they should also help in the distribution and advertisement of the new genetically-engineered corn developed by HarvestPlus.

The biggest player to end malnutrition in Zambia is its government. The Zambian government needs to help its communities in nutrition education. Additionally, the government should also help by lowering food prices, thus making it easier to live in Zambia. In the malnutrition prevention programs, the Zambian government could be saving money if they would only go about some things differently. Zambia loses \$189 million annually due to malnutrition. A World Bank study showed if Zambia would only scale up some core malnutrition programs and sand some rough edges of these programs, it could reduce \$189

million loss to only \$7 million which is a big difference (*World Bank*). A final area that the government should focus on is nutritional education.

In a perfect world, nutritional programs would be structured around entire communities but because of gender inequalities and gender status in Zambia coupled with overall fear of new ideas, this approach would be extremely hard if not impossible. The best way to structure an educational program such as this would be to aim it mainly at young males; females need to be taught about nutrition also but because of gender inequalities, the program needs to focus more on males than females. These nutritional programs would need to be free since most families can't even afford to send their children to school, and they also need to have the option of allowing older males to attend school, not just those who are school-aged. Then to further entice people to attend school, a gift package, possibly containing seeds for genetically-enhanced crops, clean water, and vitamins should be handed out. These types of programs would be funded partly by the Zambian government, but also by programs based in the United States. I believe that nutritional education is the key to unlocking the beginning of the end to malnutrition in Zambia.

People in Zambia must learn how to take care of themselves and their families, particularly the younger members of the family. Statistics have shown that children, mostly children under the age of 5, are the most affected by malnutrition. One of the steps families need to take is to teach mothers of newborns to practice exclusive breastfeeding for their newborn. Breastfeeding is crucial for a developing newborn, and many new mothers do not breastfeed their newborn child. Newborns that are not breastfed do not receive core nutrients so they run a higher risk of developing diseases or handicaps (*Lusakstimes*).

Malnutrition in Zambia is a major issue that affects Zambia's population, its economy, and its future. The issue of malnutrition should not go unnoticed in Zambia or in any other country. One of the main ways people in other countries can help deal with this issue is by sending funds to programs and organizations already working to end malnutrition in certain communities.

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