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Malawi, Factor 11: Malnutrition

Malawi: Boosting Sustainable Nutritional Intake through Native Tree Reforestation

Exhausted. Distracted. Sick. Alone. Looking up into the mountains, the light begins to fade and the stars begin to shine as the land is enclosed in a surreal beauty that seems at odds with the hunger tearing at the stomachs of the children and babies lying underneath. As the eighth poorest country in the world, Malawi is a place of cyclical famine, overwhelming poverty and rampant disease. As of 2001, the average annual income per household was $660 of which half was spent on food ("Malawi-Income"). Forced to stretch $330 for food all year, the families of these hungry children dine on little else than maize flour, a product of their own labor. Dr. Norman Borlaug, a Noble Peace Prize Laureate credited with saving a billion lives, once said, "Food is the moral right of all who are born into this world." In the past few years this moral right has been nearly achieved as caloric intake from maize consumption has provided a means of survival for these children. However, a lack in crop variation still lends to a shortage of necessary nutrients…nutrients needed in the soil to sustain healthy harvests, and nutrients needed in Malawian diets to empower the children who live between the mountains to overcome stunting, disease, and fatigue. The strength gained through food variety can provide the stimulus needed to break the cycle begun by malnutrition and allow Malawians to reach beyond more survival. A new cycle begins: Thriving. Focused. Healthy. Community.

To understand the roots and comprehend the effects of malnutrition in Malawi, one must step into the shoes of those walking in poverty. On visiting Malawi as an American outsider last summer, I served there on a mission to drill a well in the village of Kawale. Living in the Bush, I had expected the land to be covered in vegetation, and be perhaps even jungle-like. I was greatly mistaken; as I looked around and saw only dirt, termite mounds, children, and grass thatched huts. Teenage girls would walk for miles two or three times a day to get salty water from a well for their families to drink, to bathe with, and to use for cooking. Babies bounced up and down on the girls' backs, peeping out from colorfully printed chitenjes. Soon, I was carrying my own 40 lbs. bucket of water on my head and scrubbed my own clothes in a bucket. My experiences in Malawi have forever shaped my view of the nation and its people... they are strong, independent and adeptly resourceful. The only things holding them back from thriving are their poverty and impeding health issues. Upon their return home, the teens and young mothers talk in the early morning sunshine while they grind maize into flour to be made into nsima, a paste of ground maize flour and warm water, to feed their families breakfast, and later lunch and dinner. Along with this main dish, affluent families sometimes purchase usipa, which are small fish that resemble sardines found in the waters of Lake Malawi. Tomato and onion relishes occasionally find a place on plates alongside nsima as a source of supplementary flavor, but offer little nutritional content. Malawian families are large and young as the average fertility rate (as of 2013) is 5 children per woman ("World Development Indicators").

If a child gets sick, healthcare in Malawi is free to all Malawians as it is funded by the national government. Healthcare comes in three different levels: locally, regionally and district wide. Although medical aid is accessible to the public, the total Gross Domestic Product percentage spent on healthcare is only 6.2% according to WHO ("General Information…"). As a result of this general lack of funding, healthcare is severely restricted by inadequate reserves of medicines, testing facilities, and services such as imaging and laboratory work that can only be performed at district hospitals. This leads to many health concerns going untreated and contributes to the infant mortality rate in Malawi of 7.29% ("The World: Infant Mortality…"). Similar lack of funding bleeds over to the educational facilities for children (and some adults) who attend school. Sitting on the ground, students take turns writing down math problems in

a notebook and tracing letters in the dirt. There is no fee for tuition, but schools are overcrowded, lack books and other basic school supplies, and are under staffed which makes teaching, as well as learning, arduous. The national literacy rate in Malawi for women is 67.3% while the literacy rate for men is 76.5% ("General Information…"). The low rate of literate women compared to men serves to illustrate the country's priority of male education over female education. Advances in nutrient intake can help empower Malawians to overcome the nation's most dominant medical, social, educational and economic issues described above as families become healthier, more productive, wealthier and ultimately more capable of sending all of their sons and daughters to school.

Malawi's economy is largely propelled by agriculture as 85% of Malawians rely on subsistence farming. ("2015 Index of Economic Freedom"). Ninety percent of Malawi's exports and approximately one-third of the nation's Gross Domestic Product are agricultural (Manda et al, "Country Profile-Malawi"). Exported crops consist of tobacco, sugar and tea. According to New Agriculturalist,

> "Smallholder farmers contribute 75 % of food consumed and cultivate some 5.3 million hectares of arable land. Maize, cassava, sweet potatoes, rice, sorghum, groundnuts and pulses are important food crops. However, most farmers have less than a hectare on which to grow the bulk of their food. In combination with declining soil fertility and limited access to credit and extension services, this has seriously limited smallholder productivity." (Manda et al, "Country Profile-Malawi")

Livestock such as goats, sheep, cattle and chickens are also widely raised for their meat. Along with the arid soil in much of Malawi, poverty has left farmers incapable of purchasing fertilizer to feed their crops, pesticides to protect their crops from insects such as termites, farm machinery to boost crop production, and insect-proof silos to store their harvests. Additionally, low income households are deprived of their choice to grow crops such as fruits and vegetables with more nutritional value, as the financial return is less ensured than that of cash crops. In the poorest homes, the only option for purchasing at market and planting at home is maize due to its high caloric content and relative dependability. Farmers typically try to produce as much as they can on small plots of land by intensively planting and caring for crops by hand. A typical farmer may be seen at the break of dawn weeding dry, dusty fields with an old hoe as he listens to the radio. Over-cultivation of maize, without crop rotation or other sustainable agricultural practices, leads to desertification which furthers the issue of food insecurity in rural Malawi as the soil is depleted of its ability to sustain crops.

The impact of malnutrition on women and children is particularly great. The World Health Organization states that a lack of micronutrients in developing countries can lead to deficiencies in Iodine, Vitamin A and Iron which are the most important public health concerns ("Micronutrients"). In Malawi, 15.5% of children younger than five are classified as critically underweight while 13% of all babies born in Malawi are born underweight as a result of malnourished mothers ("General Information…"). Extensive cases of anemia including 47.3% of all pregnant women and approximately 73.2% of children preschool aged and under ("General Information…"), as well as extensive Vitamin A deficiencies, leave Malawians with depleted immune systems susceptible to disease, stunting, lower energy levels than what are needed for farming, an increased lack of focus for schoolwork, and higher likelihoods of birthing complications. According to the Ohio State University Food Innovation Center, Vitamin A deficiency leads to almost half a million cases of blindness in malnourished children each year ("Biomedical Nutrition..."). These same vitamin deficiencies are also responsible for skin conditions such as open sores and infections that leave children susceptible to parasitic diseases such as Malaria and Schistosomiasis. These diseases are wide spread and often are big contributors to malnutrition as parasites deplete nutrients that natives consume. In fact, Malawi is one of the top five countries in the world with the most cases of Malaria per 100,000 people ("In What Countries is Malaria Found?"). The statistics concerning malnutrition in

Malawi are far-reaching and have not showed signs of improving in the past few decades, but there may still be hope.

A few guardians of the soil still stand up strong in their fight against desertification. Moringa, Albida, Baobab, and Mango trees are the natural super heroes silently saving the soil and the diets of the few who have learned the secrets of their vitamin-rich leaves, super fruits and natural fertilizers.

Moringa is a shrub-like tree native to Malawi that is quick growing, drought resistant, acts as a windbreak and prevents soil erosion ("Traditional Crop of the Month"). The leaves contain four times the Vitamin A of carrots, seven times the Vitamin C of oranges, two times the protein of yogurt, four times the calcium of milk, and three times the potassium of bananas ounce for ounce (Gopalan). Additionally, Moringa contains all eight essential amino acids as well as ten other amino acids ("Nutritional Values"). The leaves also are anti-inflammatory, anti-bacterial, can heal skin conditions, and can stop diarrhea ("The Amazing Health Benefits…"). Moringa can be effectively incorporated into every day meals by mixing the ground leaves into nsima, relish, or even tea. Furthermore, the seed pods can be eaten as vegetables and are believed to act as de-wormers (The Amazing Health Benefits…") while the seeds can be eaten just like nuts and are antibiotics. Moringa seed oil can also be used to make beauty products which can bring in extra income for farmers as they sell their product in foreign markets. Finally, the cake from the seeds can be used to purify drinking water acting as both a coagulant and an anti-microbial ("Nutritional Values"). If knowledge of the vast health benefits of Moringa became common knowledge to foreign markets such as the United States, the demand for Moringa would increase and Malawians would be able to improve their economic livelihoods by propagating and selling Moringa overseas as well as increase their own health as they begin to embrace Moringa not only as a last minute resort in the face of famine, but as a source of nutrients and vitamins for themselves on an everyday basis. In meeting the demand, increased cultivation would fight desertification. The spread of water-bred diseases would also lessen as drinking water was purified.

Albida, Baobab and Mango trees can also play a large role in ending malnutrition. Albida is a unique tree that returns nitrogen to the soil and acts as a fertilizer. Its ability to retain its leaves during the dry season affectively shades crops from the hot sun. During the rainy season the tree drops its leaves giving plants below access to sunlight and a source of natural fertilizer. Farmers in Malawi who grew their crops under a tree canopy of Albida trees have reported that their maize yields shot up by 280% compared to that of farmer's who planted outside of the canopy (Sibale et al.). Albida trees could be the key to boosting harvests and therefore fighting the effects under consumption can have on malnutrition.

Baobab fruit is also highly nutritious and can contribute to vast increases in nutritional health if consumption is increased. The fruit and seeds of Baobab trees contain high concentrations of calcium, potassium and magnesium and can provide much needed minerals to African communities (Baidoo et al.). Powder made from the flesh of Baobab fruits has more than six times the antioxidants of blueberries, six times the amount of Vitamin C as oranges, six times the potassium of bananas, and twice the calcium as milk ("Organic Baobab Fruit Research…"). Mangoes are also native to Malawi and can directly fight Vitamin A deficiencies as one mango contains 70% of an individual's recommended daily intake of Vitamin A as well as 200% of an individual's Vitamin C (based on a 2,000 calorie diet according to the United States Department of Agriculture). This Vitamin C concentration is invaluable as Vitamin C aids in Iron absorption which can help cure cases of anemia among expectant mothers and young children.

A decline in malnutrition through increased reforestation and soil fertility would boost the population's ability to fight off disease, decrease infant mortality and growth stunting, empower children to learn more in their classes, and decrease the number of parental deaths that currently lead to child labor on a nation-wide scale. Population growth, water scarcity, flash floods and frequent droughts will continue to make the journey towards food security an uphill climb, but planting Moringa, Baobab, Mango, and Albida

trees will ensure that the soil is adequately supplied with micronutrients and Malawian diets are filled with vitamins. The mass planting of these trees throughout the farm fields of Malawi would have many trickle down effects including the increase in abundance of traditional crops, the boosted the vitality of Malawians, a kick start to childhood education, and the creation of jobs if the Malawian government realizes the reality of soil desertification and the impact that reforestation can have on Malawian diets, the Malawian economy, and the empowerment of its future generations, and puts its money where it is needed most... into the revitalization of its soil and therefore its people. Once this hurdle is leapt, the challenge will be to preserve the trees by protecting them from damaging charcoal production and ensure that the vitamins citizens consume are not lost to parasites. However, it is evident that the Malawian government oversees an extremely impoverished country, and that funds for increasing Moringa production and enforcing the end of charcoal production are simply not present at this time. Because of this, local farmers must be empowered to be able to plant more Moringa, Baobab, Mango and Albida trees through an increase in foreign markets for the products these trees yield. With a more certain market, these trees will become the new cash crop of Malawi and will gain more popularity amongst farmers.

One way this dream of sustainably ending malnutrition on the local level can be achieved is through the African SEED initiative. SEED stands for "Supporting Entrepreneurs for Sustainable Development" and currently, "strengthens the capacity of small grassroots enterprises in developing countries to enhance their social, environmental, and economic benefits, builds bridges between entrepreneurs and policy makers and stimulates exchange and partnership building. SEED was founded by the United Nations Environment Programme (UNEP), the United Nations Development Programme (UNDP) and IUCN (International Union for Conservation of Nature) at the 2002 World Summit on Sustainable Development in Johannesburg and is hosted by Adelphi Research gGmbH, based in Berlin, Germany" (Kloibhofer, et al.). One of these 'small grassroots enterprises' that is already attempting to bring Moringa to the world market is Lisa Curtis' company *Kuli Kuli*, which is based in the United States and sources Moringa from Northern Ghana to make power bars which are currently being sold in Whole Foods, Fred Myers, and Fresh & Easy stores. Her business has resulted in the planting of about 70,000 trees and Curtis pays the farmers who supply her 30% more than the market rate for Moringa so that they reap the benefits of the business (Johnson). If *Kuli Kuli* reached out to Malawi as it does Ghana, malnutrition would have a challenger indeed.

Likewise, nutritional programs led by Feed the Future have effectively fought malnutrition in Tanzania. Using support groups to reach out to undernourished mothers, Feed the Future has taught moms to use social and behavior change communication to boost their own health as well as that of their children and communities ("New Approaches to Nutrition…"). Following their example, the establishment of extension services tied to universities with the aim of educating local farmers of sustainable agricultural practices such as crop rotation, produce variation, seed collection, composting, and irrigation would hasten the victory of food security over malnutrition in Malawi. Government funded clinics focusing on the importance of consuming a variety of nutrients in one's diet can be life changing for mothers and fathers struggling to understand why their children are wasting away.

Currently at work in Malawi, Determined to Develop and RIPPLE Africa are actively working inside communities to boost nutrition. Determined to Develop gives out six types of trees including Moringa to school children for them to plant on their own land. The Moringa Meal Project is another branch of Determined to Develop that gives out school lunches containing Moringa to 700 children every day, thus boosting the number of kids attending school and helping them get an education. According to Determined to Develop, they can use $11 to feed a child for a year ("Moringa Meal Project"). Likewise, RIPPLE Africa manages 20 fruit tree community nurseries in Malawi growing citrus trees such as Mangos, Papayas and Guava. At these nurseries, families learn how to care for fruit trees before being

given some for their own land. RIPPLE Africa has worked with 10,000 families per year in the past empowering them to grow 10 trees each. It costs just $15 for 10 fruit trees through RIPPLE Africa ("Fruit Tree Project…") and these trees can produce fruits for market with proper care.

Malawi may be a place of severe malnutrition where children go to bed hungry, the land cannot support crops, girls are left at home to work in the fields, and babies find themselves orphaned as their parents die from diseases resulting from malnutrition, but there is a solution. The teaching of sustainable agricultural techniques and nutritional practices by extension services from local universities can stop the effects of malnutrition from worsening and lay the foundations for revival. With an escalated market in first world countries for sustainable Malawian crops such as dried Moringa leaves, Baobab fruit powder and Mango brought about by partnerships between farmers and small businesses such as *Kuli Kuli*, the economy will grow in Malawi and the desire to plant native trees on pieces of farmland throughout Malawi will also intensify. Farmers at this point can reach out to SEED, an organization that will help finance start up businesses aiming to use sustainable practices. Moreover, farmers can receive Moringa and Mango trees from the Moringa Meal Project and RIPPLE Africa. With Albida trees shading their traditional fields of maize, farmers will also experience a larger crop yield which can enable them to sell the excess at market and purchase more nutritious food for their families. Farmers may even feel empowered to send their children to school and try incorporating legumes and other nitrogen-rich crops into their traditional farming practices. Native tree reforestation along with increased markets, non-profit support and both agricultural and nutritional education services is the sustainable solution to achieving malnutrition elimination.

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