

Katelynn Mostek  
Osage High School  
Osage, IA  
Liberia: Malnutrition

## **Liberia: Agricultural Education and Methods**

### Introduction

The people of Liberia face many health challenges. Among these challenges, malnutrition is a major factor. Malnutrition is defined as not having enough to eat or not getting the nutrients the body requires (“Merriam Webster,” 2018). About 40% of Liberian children do not have a balanced diet and are stunted by the age of five. These physical maladaptations have life-long effects on children (Binns, 2015).

### Background Information

Liberia is a country located in Western Africa with a population of about 4.6 million people. The country borders the North Atlantic Ocean. Liberia has an area of about 110,000 square kilometers, ranking it the 105<sup>th</sup> largest country in the world. The climate region creates hot, humid, and dry winters, while summers are cloudy and rainy. The terrain in Liberia consists mostly of flat coastal plains, but there are low mountains in the northeast. The coastline has many lagoons, swamps, and rivers. Grassy plateaus further inland have the potential to support some agriculture. The highest point in Liberia is Mount Wuteve (1,446 m) and the lowest point is at the Atlantic Ocean (0 m). About 28.1% of the land in Liberia is agricultural land, and 74% of that land is permanent pasture (20.8% of land overall.) Forests cover 44.6% of the country (“World Factbook,” 2018).

Liberia’s government is a Presidential Republic meaning a president leads the executive branch and serves as head of state and head of government. The legal system in Liberia is a mix of common law and customary law. Presidents are elected by majority vote and hold a term of six years (second terms are also allowed.) There is also a legislative and judicial branch of the Liberian government. There are 30 seats in the Senate and 73 seats in the House of Representatives. Representatives are elected by majority vote from the districts. The Supreme Court consists of one chief justice and four associates all of whom are appointed by the president. Nearly 85% of Liberians identify as Christian and 12% identify as Muslims. Only 20% of Liberians speak English. The other 80% speak different languages based upon the many ethnic groups in Liberia (“World Factbook,” 2018).

The country of Liberia was made so liberated African-American slaves would be able to have a home to which they could return. “Liber” is a Latin word meaning “free”. That idea of liberty is what the Liberian government is based upon. Despite this, Liberia faced civil war and mismanagement of government between 1990 and 2000. These circumstances led to the majority of the issues Liberia faces today. In 2006 the conflict and mismanagement was partially fixed by efforts like the installation of democracy within Liberia’s government. When Ebola broke out in 2014 in Africa, again, economic activity decreased. Like during the war, many businesses fled the country. This forced the people of Liberia into another economic slow down (“World Factbook,” 2018).

Liberia’s main resource is lumber because of the vast forests through Liberia. Liberia is rich in mineral resources like iron and diamond. Other resources include rubber, cocoa, and coffee. Exports experiencing major growth are palm products and oil. Liberia’s government is currently trying to push timber extraction and is looking into more oil exploration.

### Family Life

In general, Liberian families in urban and rural areas live very different lifestyles. In rural areas families have limited access to electricity and clean water. Liberia is said to have the lowest accessibilities to electricity in the world. In some areas it is difficult to reach clean, safe drinking water. The unclean water can cause diarrhea and other sickness. Rural areas also have very limited methods of transportation. There are not many developed roads, so it is often difficult for families to reach markets. Western medicine practice is usually found in a small fraction of major cities. Commonly, religious medicine is practiced in rural areas, where health care and hospitals are not available.

The typical home in rural Liberia is a small, round hut with a thatched roof. Occasionally newer homes are built in square or rectangular shapes and topped with corrugated zinc or tin roofs. On average there are about 5 people per household. "Bush Schools" are a common form of education. "Bush Schools" are schools that commonly teach ritual, cultural practices, and behaviors to students. Access to higher education is often limited; usually, it is difficult for citizens to find or have enough funding to attend schools with higher education ("Global Communities," n.d.).

Some common jobs for Liberians include working on timber farms and oil refineries, or in mines. About 70% of the work force works in agriculture, 22% work in services and 8% have industrial jobs. As of 2017 the per capita GDP of Liberia was estimated at about \$900. Rice is a primary staple food. Often savory sauces, meat, and fish are used to garnish or flavor foods, but not as the main meal. Liberians also eat mangos, bananas, sugarcane, and coconut as snacks when they have access to them ("World Factbook," 2018).

### The Issue: Malnutrition

Malnutrition is one of the major issues Liberia faces. It can even be pinned as one of the most devastating and impactful issues. Malnutrition can affect individuals and economies as a whole in negative ways. One in five children in Liberia have been affected by the malnutrition: that is close to 230,000 children. Overall, about 35.8% of Liberians are undernourished. The rate of children that are malnourished has been relatively consistent in recent years. This means the minor efforts that have been put in place by the government to fix this issue are not resulting in improvement.

Malnutrition can have devastating effects. In Liberia malnutrition tends to hit children the hardest. The first 1,000 days of a child's life are the most important to cognitive and physical growth. Children can have stunted growth and even effects as devastating as death from being undernourished. The mortality rate for Liberian children under the age of 5 is 53%. Malnutrition plays a huge role in this inordinate number of child deaths ("Humanium," n.d.). Babies can even be impacted by malnutrition before they are born. Large portions of Liberia's undernourished population are pregnant women. Being malnourished while pregnant leads to negative effects on the mother and the child. Malnutrition can also make people more susceptible to illness or infections. On top of this it makes injuries and illness more difficult to address. Commonly, malnutrition related deaths are due to illnesses or injuries. Without proper nutrition the body is unable to heal itself or fight off illness. Malnutrition the physical and mental effects can be blamed for the slowdown of all of Liberia's economy. Someone affected by malnutrition could have a much more difficult time getting an education, finding or holding jobs, and reaching high productivity.

So, what causes the issue of malnutrition for Liberia? There are a lot of factors contributing to Liberia's malnutrition problem. Poverty is an easy factor to blame, and the correlation seems strong since, about 54% of Liberia's population is below the poverty line. This widespread lack of resources creates a challenge for Liberians to purchase enough food, and healthy food at that, to feed their families properly. There are many other factors contributing to Liberia's malnutrition as well. Overpopulation, unsanitary conditions, climate change, lack of soil nutrients and inefficient farming practices, government disinterest, food distribution obstacles, cultural practices, the recent civil war, and lack of education on proper nutrition have also been to blame.

Nutrition education is nonexistent in Liberia. This means even if all the other factors contributing to malnutrition were resolved, Liberians still could struggle with lack of proper vitamins or micronutrient deficiencies. Even those with enough money to buy food can struggle with micronutrient deficiency. Many Liberians eat a diet consisting mainly of rice, which holds little nutrients. The percentage of young women and children with micronutrient deficiency is the highest. This contributes to the physical and mental effects of malnutrition from being stunted. Lack of nutrition education can be seen easily through mothers and children. "Less than 20% of children [are] exclusively breastfed at six month[s]." Liberian mothers do not understand the importance of this stage in their child's life. Because of this the country is ranked at having the most maternal mortalities ("Health/nutrition sector report," 2003).

One of the major issues, besides poverty and lack of nutritional education, is lack of soil nutrition and efficient farming practices. Soil quality in most of Liberia is very poor. Only 2.1% of land can be used for permanent crops ("World Factbook," 2018). This means other crops must be moved year to year because of the lack of nutrients in the soil. Moving crops every year has increased the rate of deforestation over the years as well. With many rural families depending farms to feed their families and earn money, having to move crops every year makes it difficult. Since many farms are in poverty-stricken, rural areas, farming practices are not always modern or efficient.

### The Solutions

There is not a simple fix to malnutrition in Liberia. Malnutrition has many factors contributing to it and is a factor contributing to many other issues in Liberia. There are many different solutions being tested for malnutrition throughout the world. Factors contributing to Liberia's malnutrition can be difficult, if not impossible to change. Climate change, soil quality, and Liberia's recent civil war are all factors that cannot be changed. Solutions have to focus on the factors that are capable of being changed. One of the biggest obstacles in coming up with an effective solution for another country is working within the culture of that country. Countries in Africa, including Liberia, tend to be very traditional. This makes implementing large plans for change very difficult.

A solution that could be proposed is a four-step process that makes the jumps in these changes not seem so large. The proposed solution would also work around Liberian culture so Liberians do not feel pressured by another country or culture. This four-step solution would include these levels: (1) implementing education on food and nutrition, (2) education on hybrid seeds/crop rotation with model farms of hybrid seeds/crop rotation, (3) more education on food and nutrition, and (4) education on GMOs with model farms of GMOs. This solution has both an education aspect and a way to put the knowledge to use.

The prevalent lack of knowledge on food nutrition is one of the most impactful factors to Liberia's malnutrition problem. Pregnant women and mothers often do not get enough nutrition for themselves and for their babies. Most children are stunted by age five. First, mobile learning

centers and programs could give Liberians the information they are lacking on food nutrition. Knowledge on food could be life changing and with great enough efforts could change the whole dynamic of the country. These programs could focus on rural areas where malnutrition hits the hardest and where most families grow their own food. Programs could include food nutrition education and education on agricultural practices, since most Liberians own a family farm. Education programs could employ Liberians to teach others about healthy diets, getting proper vitamins, and agricultural practices that could potentially be implemented. Major focus points could be on pregnant women and mothers. These women exert the most dietary influence on children. These concepts could even be put into the “Bush Schools” which are the education systems Liberia already has. These programs could prove to Liberians the amount and types of food they should be getting versus what they are actually getting. It is possible these people could even share low-cost, healthy meals. They could also teach farmers more efficient methods to better their own farms.

Secondly, mobile learning centers could become a way to not only educate on the importance of eating balanced diets and getting proper vitamins, but it could also shift the agricultural views in Liberia. The next step that would be taken would be the set up of model farms with hybrid seeds and the concept of crop rotation. Crop rotation can replenish soil of vital nutrients. Hybrid seeds are used in about 99% of American corn crops (“Living History Farms,” 2018). Humans have been breeding seeds selectively for hundreds of years. Hybrids are just seeds bred to strengthen certain traits within the seed. Seeds can be made to hold up better in certain conditions and to resist diseases. Liberia in particular has very poor soil quality. Hybrid seeds could target traits to be more successful in soil lacking nutrients. Using hybrids could mean crops are more successful. The increased production of crops could make Liberian farmers more successful. For Liberians this could also mean fields would not have to be moved every year. This would make less labor on farmers and cut down on the rate of deforestation in Liberia.

After implementing hybrid seeds more Liberian farmers would be receptive to other seed options. The implementation of genetically modified seeds in farming practices could also decrease malnutrition. The third step would include genetically modified seeds. Often called GMOs, these are seeds in which DNA has been altered so the plant exhibits new qualities. These qualities are often advantageous to survival, but also, GMOs can be programmed to hold vitamins and nutrients the plant did not originally have. By increasing the amount of GMOs used in Liberia, Liberians could be getting more of the vitamins they are lacking without changing their diet. This tactic could be very successful through the correct education because it minimizes interference of Liberia’s culture. Rice is a staple food of most Liberian diets. It is often eaten with every meal as the main course. Rice holds little nutritional value though. The average adult woman is suppose to consume at least 2,000 calories a day and the average man about 2,600 calories. A cup of rice provides about 216 calories (“Healthy Options,” n.d.). This means an adult male would need to consume at least 12 cups of rice to hit their minimum for the day. On top of this rice provides some iron and magnesium, but what about other important vitamins that are needed by the human body?

Model farms are a great way to show new methods of farm production. Throughout this entire process, model farms could be set up along side the education programs so Liberians can learn about the benefits of switching to hybrids, crop rotations, and eventually GMOs. These farms would allow Liberians to see the results of these methods. The model farms could have the hybrid and GMO seeds grow every year so farmers can be shown the result of both. Liberians could be sent home with test seeds of hybrid or GMOs to be able to test the results for a year themselves to decide. This gives Liberian farmers the choice to continue current practices or to try the new methods. This could be set up as a four-step process: education on food and nutrition, education

on hybrid seeds with model farms of hybrid seeds, more education on food and nutrition, and education on GMOs with model farms of GMOs. (See “*Malnutrition Solution in Liberia Flowchart #2*” attached)

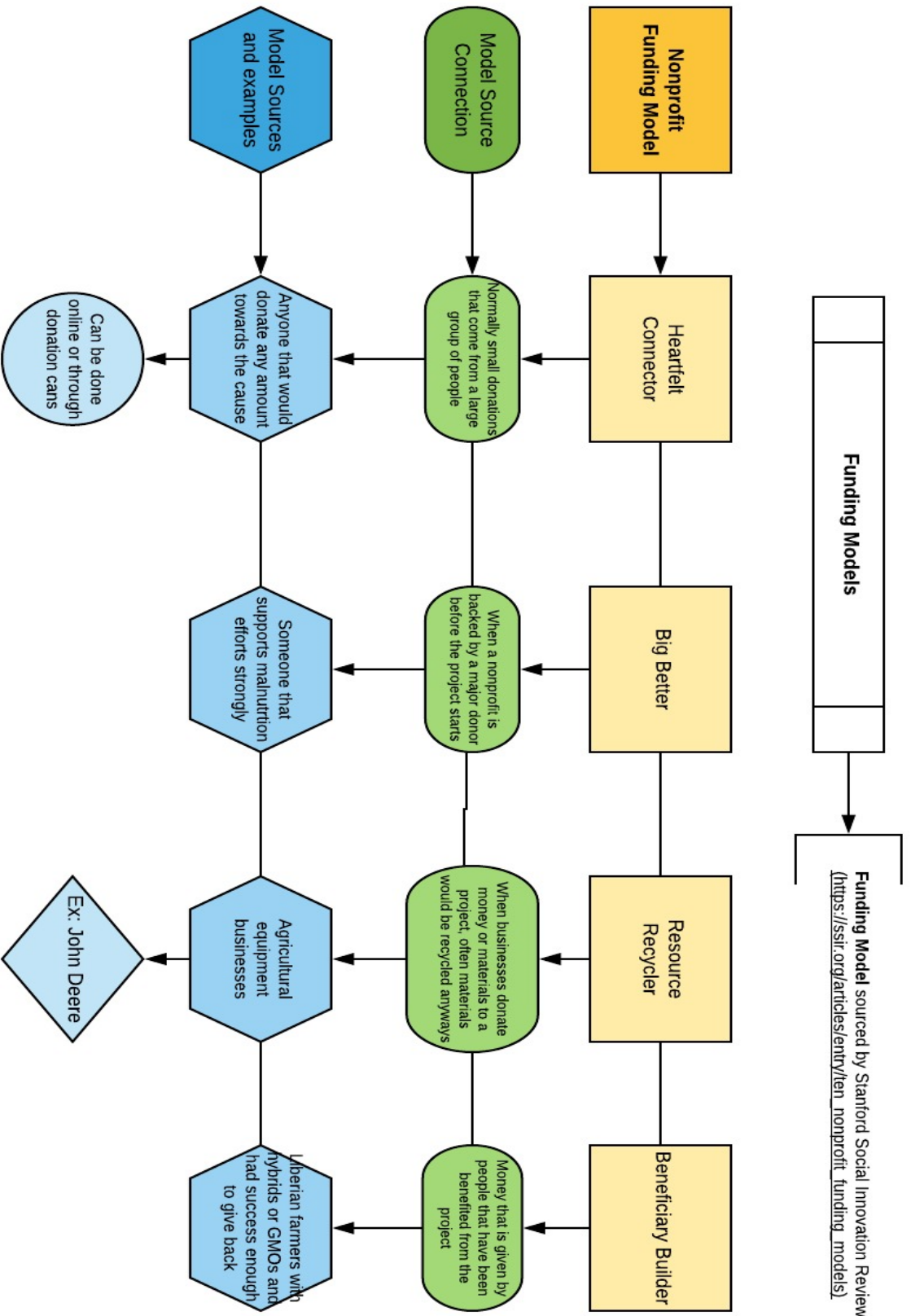
### Funding the Solutions

An important piece to the solution of malnutrition in Liberia is funding the programs that are set up. Funding the education and model farm pieces are important, but there should also be funding to help Liberians that would like to make the switch to different seeds. Many rural Liberian families also deal with poverty so the funding could help them switch over for the first couple years. That would also encourage more Liberians to make the conversions. There are several ways to fund non-profit humanitarian projects (Foster, Kim, & Christenson, 2009). The *Ten Non Profit Funding Models* article had ten ways to fund a program like this. The models that would best apply to the project include (See “*Funding Models Flowchart #1*” attached):

1. **Heartfelt Connector-** The *heartfelt connector* method of funding is done by donations given by large numbers of people with all types of income levels. This basically provides the opportunity to get personal donations by anyone who feels it is a worthy enough cause to put money towards. Usually this method is done by held events to raise awareness and money. The *heartfelt connector* method is often successful due to the extensive amount of awareness on the project and by hitting an emotional spot on potential donors. Liberia’s malnutrition project could provide this sense of need giving/showing brief information on the need to resolve this issue.
2. **Big Bettor-** The *Big Bettor* model is way to start a project with some financial stability before the project is even put in place. A founder or major donor who strongly believes in the project usually does this type of funding. Through this model a project can be launched with financial backing, but will often need other methods of funding to continue to run. This method is often used in large research projects and environmental issues. With the Liberian malnutrition project this money could go towards the research needed to create an effective education program and the research put into the hybrid and GMO seeds that will be offered. Funding towards this issue could come from seed companies or genetic engineering laboratories.
3. **Resource Recycler-** The *resource recycler* method would focus on larger scale donations by businesses backing the issue. Usually these businesses are related to the project in some way. With the Liberian malnutrition project agricultural businesses would be most likely to donate money, materials, or equipment to help set up the program. Often times these resources are items that would otherwise go to waste, hence the name *resource recycler*.
4. **Beneficiary Builder-** The *beneficiary builder* method is a way of funding that could not be used until the project has a success story. Through this type of funding people who have benefited from the program enough are able to give back to the program to help it continue to run. With the Liberian malnutrition project specifically, farmers that were helped to start their switch to hybrid or GMO seeds could donate money back to the project once their crops become successful. This is a strong method of funding because the people donating through the *beneficiary builder* method have been through the process and have had success. This means they will have close ties to the project, and would have the best ideas of the benefits of it.

### Summary

Overall, Liberia faces a devastating problem: malnutrition. Currently, Liberians have not had enough help in resolving malnutrition. A solution that could hold much impact on this issue can be summed up in a four-step process: (1) implementing education on food and nutrition, (2) education on hybrid seeds/crop rotation with model farms of hybrid seeds/crop rotation, (3) more education on food and nutrition, and (4) education on GMOs with model farms of GMOs. With this cycle Liberian farm practices would be the most efficient practices known to humans today. There would be an increase in crop production and Liberian vitamin intake. Also, through this solution there is not much inference with Liberian culture. This solution could be funded through four different models that have been picked specifically for the situation. These funding models would help to fund the set up of education centers, model farms, pay Liberian employees, and help Liberians that want to make the conversion able to fund their first years.



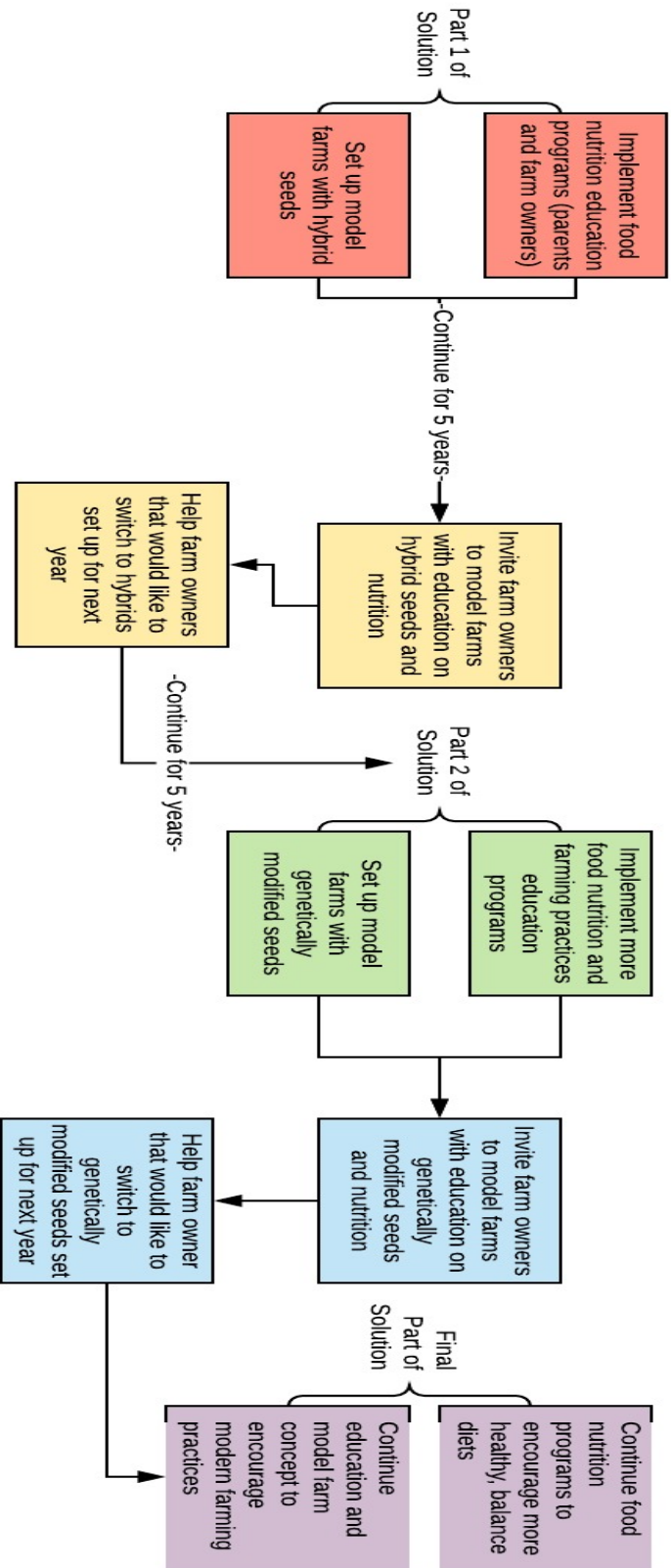
Funding Models

Funding Model sourced by Stanford Social Innovation Review  
[https://ssir.org/articles/entry/ten\\_nonprofit\\_funding\\_models](https://ssir.org/articles/entry/ten_nonprofit_funding_models)

Flowchart developed by  
 Kate Mostek  
 Osage High School  
 Malnutrition in Liberia

**Malnutrition Solution in Liberia**

Flowchart designed by  
 Kate Mostek  
 Osage High School  
 Malnutrition in Liberia





## Bibliography

"The World Factbook — Central Intelligence Agency." *Cia.gov*. N. p., 2018. Web. 1 Feb. 2018.  
<<https://www.cia.gov/library/publications/the-world-factbook/geos/li.html>>

"Children Of Liberia - Humanium • We Make Children's Rights Happen." *Humanium • We make children's rights happen*. N. p., 2018. Web. 1 Feb. 2018.  
<<https://www.humanium.org/en/liberia/>>

"UNICEF Liberia - Nutrition - Nutrition In Liberia." *Unicef.org*. N. p., 2018. Web. 1 Feb. 2018.  
<<https://www.unicef.org/liberia/nutrition.html>>

"Malnutrition In Liberia, An Epidemic | The Borgen Project." *The Borgen Project*. N. p., 2015. Web. 1 Feb. 2018.  
<<https://borgenproject.org/malnutrition-liberia-epidemic/>>

"Liberia: Health/Nutrition Sector Report." *ReliefWeb*. N. p., 2018. Web. 1 Feb. 2018.  
<<https://reliefweb.int/report/liberia/liberia-healthnutrition-sector-report>>

McAdams, Molly. "Symptoms Of Protein Malnutrition." *LIVESTRONG.COM*. N. p., 2017. Web. 1 Feb. 2018.  
<<https://www.livestrong.com/article/18874-symptoms-protein-malnutrition/>>

"Large Scale Food Fortification - Global Alliance For Improved Nutrition." *Global Alliance for Improved Nutrition*. N. p., 2018. Web. 21 Feb. 2018.  
<<https://www.gainhealth.org/future-fortified/>>

"Definition Of MALNUTRITION." *Merriam-webster.com*. N. p., 2018. Web. 1 Mar. 2018.  
<<https://www.merriam-webster.com/dictionary/malnutrition>>

"Liberia: Nutrition Profile." *Usaid.gov*. N. p., 2018. Web. 15 Mar. 2018.  
<<https://www.usaid.gov/what-we-do/global-health/nutrition/countries/liberia-nutrition-profile>>

"The Science Of Hybrid Crops." *Livinghistoryfarm.org*. N. p., 2018. Web. 15 Mar. 2018.  
<[https://livinghistoryfarm.org/farminginthe30s/crops\\_03.html](https://livinghistoryfarm.org/farminginthe30s/crops_03.html)>

"What Nutrition Does Rice Provide? - Healthy Options, Philippines : News Digest." *Healthy Options*. N. p., 2018. Web. 15 Mar. 2018.  
<<https://www.healthyoptions.com.ph/newsdigest/health-manual-for-all-ages/what-nutrition-does-rice-provide>>

"Ten Nonprofit Funding Models (SSIR)." *Ssir.org*. N. p., 2018. Web. 15 Mar. 2018.  
<[https://ssir.org/articles/entry/ten\\_nonprofit\\_funding\\_models](https://ssir.org/articles/entry/ten_nonprofit_funding_models)>