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Haiti, Factor 11: Malnutrition

### **Haiti: Malnutrition**

Over the last few years Haiti has been in the news quite a bit. From the devastating earthquake in 2010 to the cholera outbreak, this little island country has been a major focus for media. When Haiti is in the news one thing is apparent, how poor and unfortunate the people of Haiti are. This country is one of the poorest countries in the Western Hemisphere. Why are the people of Haiti so poor? To understand why, you first need to understand some of the history. Haiti is located on the island of Hispaniola along with the Dominican Republic. Hispaniola is located in the Caribbean about 700 miles from the tip of Florida. The island was first discovered by Christopher Columbus in 1492. Christopher Columbus claimed the island for Spain. The Spanish enslaved the native people and soon they were wiped out. They brought in black slave labor from Africa to replace the native people. After 195 years of Spanish rule, Haiti was given to France, after a war. In 1791, Haiti's 400,000 slaves revolted against the French. This forced France to abolish slavery in 1794. Then a former slave, Toussaint L'Quverture, seized control of the colony in 1801. Toussaint was then captured by the French army. Toussaint's followers then destroyed the French army through guerrilla warfare. Independence was won on January 1, 1804, but it wasn't until 1838 that France officially recognized Haiti's freedom (History, 2010). This freedom came at a high price. France forced Haiti to pay a 150 million franc indemnity. This crippled Haiti (A Short, n.d.). From Haiti's independence to today, Haiti history is filled with ruthless dictators, deceitful president, and power hungry generals. Things in Haiti got even worse when in 2010, a catastrophic earthquake struck Haiti. Haitians are victims of their environment, they can't help that they are poor. A series of unfortunate events caused the people of Haiti to be in dire need of help. They can't help themselves, so it is our responsibility to help those in need and come up with a solution that will bring people out of the depths of poverty (History, 2010).

There are about ten million people living on Haiti's side of Hispaniola (Central, 2013). In Haiti, most families are made up of a couple and their dependent children. The average household size is 4.2. Most parents have a hard time providing for their families (Hope International, n.d.). The unemployment rate was estimated to be 40.6 percent in 2010, which it has most likely risen even more since then (Central, 2013). Average per capita income in Haiti is \$480 year. This is about a \$1.30 a day. With little more than a dollar a day, Haitians can't buy very expensive food (88 Little, 2010). The staples of a Haitian diet are black eye peas and rice. Other common foods consumed included sweet potatoes, yams, corn, pigeon peas, cow peas, bread, and coffee. They don't typically eat meat because of its expense (Adoption Nutrition, n.d.).

Poverty is fairly common in Haiti. Eighty percent of the people live below the poverty line. Poverty affects the children of Haiti the most. Poverty causes violence and diseases to run out of control, killing many Haitians. This causes many children to become orphans. In the Western Hemisphere, Haiti has the highest percentage of orphans. It was estimated that there were over 430,000 orphans and that was before the 2010 earthquake. With many children orphans and many more living in fierce poverty, children can't concentrate on their education. The literacy rate in Haiti is 48.7 percent. Compare that to the United States literacy rate of 99 percent (Central, 2013). Of all the children enrolled in elementary school only 10 percent go on to high school. An even more interesting fact is that more than 50 percent of all children enrolled in a school are enrolled in a non-state school. The country has only 1,240 public schools, but has over 14,000 private schools. Many private schools don't receive any money from the government. This means that most children have to pay tuition to get in school, and as stated above a majority of families live below the poverty line and can't afford school (Haiti - Social Resilience, 2006).

Education isn't the only worry of the children of Haiti. What if they or their parents get sick? As you could imagine the health care system of Haiti isn't top notch. Of the ten million who live in Haiti, just 40% have access to basic healthcare. This causes a mess of problems. Probably the most notable problem is the HIV/AIDS epidemic in Haiti. What makes this epidemic even more compelling is the fact that it could have started in Haiti. In the 1980s the United States' CDC traced quite a few early AIDS cases to Haitian immigrants, and with the rates of HIV/AIDS estimated to range from 4.5-12 percent, the epidemic doesn't want to end (88 Little, 2010). Even if you can make it to a hospital, there are very few hospital beds and even fewer doctors. There are three hospital per a 1,000 people and 2.42 physicians per 1,000. Infant mortality rate is also high, with 74 deaths per 1,000 births. Of the infant that do live, many could be killed by very preventable diseases. Only 50 percent of children are vaccinated. All of this makes for a low life expectancy rate of about 60 years (Healthcare, n.d.).

One of the reasons why many people don't have access to basic health care is the remoteness of where they live. Seventy-nine percent of the population lives in rural areas. In these rural areas, to get even the most basic necessities for life they need to make or grow them. In order to grow crops, they need land and Haitians don't have much. Less than two acres is all a typical family farm has to grow crops. The little land they do have to farm, have subsistence crops being grown on them. Subsistence crops are crops that used by the family for food. Crops that are grown by Haitian farmers include bananas, corn, yams, sweet potatoes, and rice. If the farmer is lucky enough they will own some livestock. The most common livestock are goats and cattle, with fewer pigs and horses, and a very small amount of poultry (Encyclopedia, n.d.). In Haiti a very common agriculture practice is what is called Kombit. Kombit is a system of interacting that is based on sharing and not selling. In Kombit, the community gets together to plan the crop, harvest it, and shares it. This leads to a very close community (Berthold, n.d.).

Even with Kombit to help produce food, there are still major barriers to improving agricultural productivity. A major barrier is the lack of farmable land. The land that is very easy to cultivate has little to no nutrients. Much of the rich soil is located on steep hills and mountains. This makes farming this land very difficult. The scarcity of land can be seen through the destruction of original woodland. The competition over land has caused massive deforestation. This leads to lethal mudslides and flash floods, making farming even more difficult (88 Little, 2010).

There are many problems in Haiti. You could write a book just discussing the many things affecting a typical family in Haiti, but one of the most prevalent problems is malnutrition. Malnutrition is the condition that develops when the body does not get the right amount of the [vitamins](#), minerals, and other nutrients it needs to maintain healthy tissues and organ function. Sixty percent of Haiti's population is undernourished, many due to the lack of protein, fruits and vegetables. The statistics get worse from there. Thirty percent of children under five suffered from chronic malnutrition and ten percent of children under five suffered from acute malnutrition (Bassett, 2010). The difference between chronic malnutrition and acute malnutrition is that chronic is long term and leads to stunted growth. Acute is rapid weight loss or failure to gain weight normally (Types, n.d.). There is some hope though. A survey by the UNICEF and the World Food Programme (WFP) has shown malnutrition has decreased slightly among children, but it still very common (Suh, 2010). Improving malnutrition will greatly affect the people of Haiti. Children can focus less on where they will get their next meal and more on their education. Life expectancy will increase. People will be less susceptible disease and the overall quality of life will be better for people of Haiti.

In order to solve the problem of malnutrition in Haiti, their needs to be a solution that will be permanent. We need to teach the people how to fish, instead of giving them a fish. We want them to be able to live without our help. There are two possible solutions that could help solve Haiti's malnutrition. The first is a system that has been used for hundreds of years, but has made big strides in the past century. It has no

effect on land and uses less water than traditional agriculture. Not only do you produce crops in this system but you also produce fish. The first solution for solving Haiti's malnutrition is aquaponics.

Aquaponics is a way to produce food in a system that combines conventional aquaculture, (raising fish in tanks), with hydroponics (cultivation plants in water) in a symbiotic environment. It has many advantages over traditional farming. Even though aquaponics seems like a new technology, it can actually find its roots in ancient farming methods. The Aztecs made rafts, called chinampa. They filled them with dirt and floated them on a lake. As the plants grew, their roots went through the soil and dangled in the water. Modern technology has made the original aquaponic system, chinampa, even better. Now with aquaponics, food can be grown almost anywhere. Food can be grown in an urban area, rural area, or a side of a mountain. Aquaponics produces very high quality and nutritious foods that can provide all the nutrition that the people of Haiti are lacking.

In aquaponics, high volumes of crops and fish can be produced in a small area. You can also grow a variety of crops, including lettuce, herbs, tomatoes, cucumbers, squash, and melons. While tilapia is the most common fish grow in aquaponics, largemouth bass, bluegill, catfish, and koi have been raised in aquaponic system before. With some fish like barramundi, jade perch, silver perch, and Murray cod showing great potential of being raised in aquaponics.

There are a few downsides of aquaponics. One downside is an aquaponics system is very fragile in its early stages. To understand why the system is fragile in early stages, you need to understand how the system works. Fish and plants play a huge role, but there is also a third organism that allows aquaponics to work and it is bacteria. The fish, plants, and bacteria work together to make a process called nitrification work. The nitrification process is where nitrosomonas species of bacteria convert ammonia into nitrite and then nitrobacter species of bacteria convert nitrite into nitrate. In an aquaponics system, the fish produce the ammonia. The bacteria convert the ammonia into nitrites then into nitrates. The plants then use up all the nitrates and other nutrients, therefore, cleaning the water for the fish. Before you can start growing plants, you have to get the beneficial bacteria to occupy the system. The establishment of these beneficial bacteria is called cycling. Cycling can take a while. It could take up to six weeks, if not more, for the establishment of the bacteria. The reason why the system is fragile during cycling, is the system is very unstable. The conditions have to be perfect and very often in a new aquaponic system, the conditions in the system are constantly fluctuating. When the system has been running a while and is fully mature, it greatly stabilizes. So once the system is stable, the problem of it being very fragile doesn't exist. A bigger drawback is an aquaponic does require electricity. A system needs electricity for the water pump, an aeration system, and a water heater and/or chiller. This drawback can be solved though and a few systems are completely off the grind. Although there are a few downsides to aquaponics, it is still a great solution for Haiti.

One of the best parts about aquaponics in Haiti is the fact that a few aquaponic systems have been established in the country. One system was made by Luke's Mission, Inc. This system is located in Fondwa, Haiti. The interesting fact about this system is it doesn't require any electricity. Water circulation and aeration is provided by a manual water pump. The system was operated by a local farmer. The farmer would take what he needed to support himself and his family from the system and then sell the rest to his fellow villagers (Perry, 2004). This is key to aquaponics in Haiti. It not only showed the willingness of Haitians to learn and use the food grown by the aquaponic system, but it also supported the local economy. Another aquaponic system is located at the Northwest Haiti Christian Mission in St. Louis Du Nord. This system is made by Nelson and Pade, Inc. It has a complete energy system that includes solar panels, battery bank, and generator back-up. This system is operated by the staff of the Northwest Haiti Christian Mission and then the food is distributed to those in need in the area (Meyers, n.d.).

These two systems work well and show the potential of aquaponics in Haiti, but they differ in a couple of ways. First they use different growing techniques. The Northwest Haiti Christian Mission's system the plants are produced in a raft system. In raft production the plants are grown on rafts, floating on the top of water. The rafts are usually made of polystyrene boards. Raft systems use simple filters to filter solids produced by the fish. Most raft systems have two filters. The first filter uses gravity to separate large and heavy solids from the water. This filter is empty often so you don't get a large build up of solids, which takes a while to break down. The second filter is filled with fine netting that catches the small solids that are suspended in the water. This filter is empty less often, allowing the suspended solids to break down in the system to provide extra nutrients for the plants. Luke's Mission Incorporated's system uses a media filled bed system. In media bed systems the rafts are replaced by a container that is filled with gravel or another inert growing media. There also no filters in this system. The solids are allowed to collect in the system. So media bed systems are simpler than raft. This is a trade off though, because media beds don't produce as much as rafts (Nelson,n.d). The bottom line is both systems have been proven in Haiti and work well.

These systems would be perfect for many villages in Haiti. The people in a village could grow food together in one large community aquaponics system. Unfortunately most Haitian villages don't have the money to buy and set up an aquaponic system. A way this could be done is with donations from local and international organizations. Another possible way to get money is micro grants. A few organizations offer them. A notable one is the Aquaponics Association. They offer micro grants of a thousand dollars to help aquaponics grow through education and outreach. This money would be enough to help build a system. No matter what way is used to get money, it is important to work with government. The government could help with money to set up aquaponics system, but there is a few problems with that. The government has a large amount of debt and its budget is small (Bell,2013). There are also many problems plaguing the government. A major one is political corruption. The Corruption Perceptions Index, a measure of perceived political corruption, has ranked Haiti as one of the most corrupt nations (Transparency, 2012) . Fixing Haiti's government is a huge issue, something that will take time and a lot of intervention from other nations. For now all that can be done is to try to work with the government and hope for the best. Maybe a good place to start is to show the government that aquaponics is something that could solve malnutrition in Haiti. A good way to do that is set up some systems at the local universities. The universities are some of the most powerful institutions in the country. Also working with the universities can help with teaching the Haitians how to use aquaponics. Through multiple ways of raising money aquaponics can become very successful in Haiti.

The second solution to Haiti's malnutrition is something that is very easy to grow and is very nutritious. It will be a supplement that will be eaten along with the fish and plants from the aquaponic system. It along with the fish and plants from the aquaponic system will provide the majority of nutrition that a typical Haitian will need. It is called microgreens and these little plants are perfect to provide extra nutrients for a typical Haitian family. Microgreens are green vegetables and herbs that are harvested when the first leaves appear. According to researchers, some microgreens contain up to 40 times higher levels of vital nutrients than their mature counterparts. Microgreens have been shown to have high levels of vitamin K, vitamin C, vitamin E, lutein, and beta-carotene (Warner, 2012). The best thing is they are easy to grow and grow very fast. To grow microgreens all you need is some kind of tray, growing medium, seeds, light, and some water. All you have to do is put some growing medium in a shallow tray. Then scatter a layer of seeds over the growing medium. Keep the seeds in a well lit area and mist the seeds daily. The growing medium needs to be kept moist, but not soaking wet. After two to three weeks, the microgreens can be harvested (Diehl, n.d.). This short growing time and easiness to grow will be ideal for a Haitian family. A possible problem to overcome with microgreens would be social acceptance. Would eating microgreens be socially acceptable? In Haiti vegetables are eaten often and microgreens are just vegetables that aren't fully grown. They are also very tasty and can be used in many Haitian dishes. It should be very easy for aid workers to get the people of Haiti to consume microgreens, because they taste better than the

supplements that are usually given out. With the help of aid worker Haitians can grow microgreens in their homes and villages.

Haiti is in need of help. The problems in Haiti are numerous. It will take many solutions to solve the many problems of Haiti. Malnutrition should be one of the first to be solved. It is easier to get an education, a job, and live longer when your stomach is full and you have proper nutrients. There are two possible solutions that will help the people of Haiti get proper nutrition. The first solution is aquaponics. Aquaponics produces fish and produces that are high quality and high in nutrients. Money and supplies would have to be donated and people taught to use aquaponics, but once the system is set up food can be grown for many generations. The second solution is tasty, nutrient rich microgreens. There will have to be donations of microgreens growing kits to each family. They then can grow microgreens for their families. Through these solutions malnutrition will be solved in Haiti. It is time we start growing our way to a better future.

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